**US Army Corps
of Engineers**
Waterways Experiment
Station

1994 Annual Index of Wind Wave Directional Spectra Measured at Harvest Platform

by   Charles E. Long

WES

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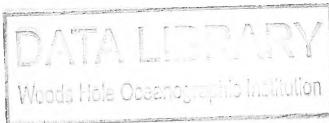
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1994 Annual Index of Wind Wave Directional Spectra Measured at Harvest Platform

by Charles E. Long

U.S. Army Corps of Engineers
Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS   39180-6199

Final report

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Preface

This report indexes parameters of and describes means of access to a series of wind wave frequency-direction spectral observations made with a six-element, high-resolution directional wave gauge at Texaco Oil Company's Harvest Platform. The work was motivated by a need to publicize these results so they can be used by all investigators interested in natural wind wave energy distributions at a deepwater site near the exposed California coast. This effort was authorized by Headquarters, U.S. Army Corps of Engineers (HQUSACE), under Civil Works Coastal Navigation Hydrodynamics Program Research Work Unit 32484, "Directionality of Waves in Shallow Water." Funds were provided through the Coastal Engineering Research Center (CERC), U.S. Army Engineer Waterways Experiment Station (WES), under the program management of Ms. Carolyn M. Holmes, CERC. Messrs. John H. Lockhart, Jr., Charles Chesnutt, and Barry W. Holliday were HQUSACE Technical Monitors.

This report was prepared by Dr. Charles E. Long, under the direct supervision of Mr. William A. Birkemeier, Chief, Field Research Facility (FRF), CERC, and Mr. Thomas W. Richardson, Chief, Engineering Development Division (EDD), CERC. General supervision was provided by Dr. James R. Houston and Mr. Charles C. Calhoun, Jr., Director and Assistant Director, CERC, respectively.

Mr. David D. McGehee, Prototype Measurement and Analysis Branch, EDD, CERC, was instrumental in coordinating the efforts of CERC and the State of California in data archiving and gauge maintenance by the Coastal Data Information Program (CDIP) at Scripps Institution of Oceanography (SIO). Data transfer between SIO and the FRF was coordinated under the direction of Dr. Richard J. Seymour, CDIP, with particularly helpful assistance from Ms. Julianna Thomas, CDIP. Ms. Judy H. Roughton, FRF, produced Figure 1 of this report. The contributions of all these individuals are gratefully acknowledged.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

1   Introduction

In late December 1992, a high-resolution directional wave measuring system became fully operational on Texaco Oil Company's Harvest Platform to make long-term observations of the deep-ocean wind wave climate in the vicinity of the Southern California Bight (Figure 1). Such observations are necessary to provide
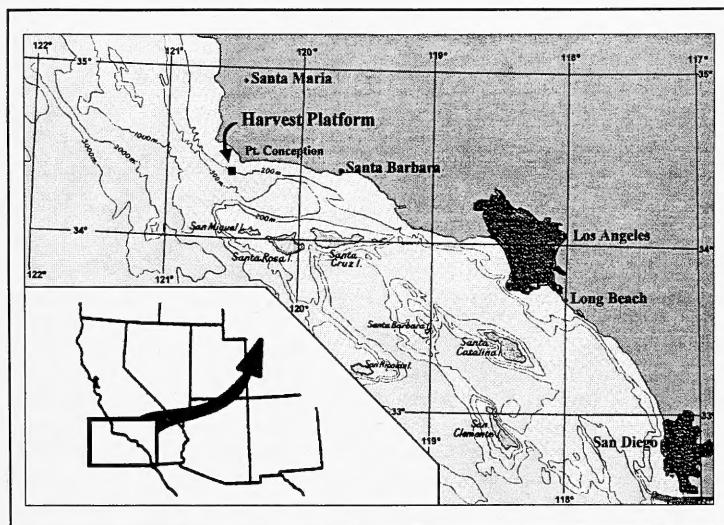
Figure 1. Southern California Bight and location of Harvest Platform

ground truth for interpreting satellite imagery of the ocean surface, test evolution and propagation models of open-ocean wind waves, and establish seaward boundary conditions for models of wave propagation and transformation from deep water to coastal regions. The purpose of this report is to encourage broad use of these observations by parametrically describing 2,320 wind wave frequency-direction spectral estimates obtained in calendar year 1994, and identifying a means whereby an investigator can access these spectra. These results are from the second year of collection. Results from the first year are described by Long (1995a).

For completeness, this report briefly describes the directional gauge geometry and data collection scheme (Chapter 2), error checking procedures and basic directional estimation algorithm (Chapter 3), and definitions of parameters used to characterize the observations (Chapter 4). Appendix A contains a table of these characterizing parameters, and acts as an index for the 1994 database. Time series graphs of these parameters are presented in Appendix B. Chapter 5 describes how data can be obtained as well as the data format and file-naming scheme.

2   Directional Gauge

Gauge Location and Array Geometry

As indicated in Figure 1, Harvest Platform is located about 20 km (10.8 n.m.) west of Point Conception, California, in water with a mean depth of 202 m (663 ft). Waves originating in the greater Pacific Ocean can reach the platform via relatively unobstructed paths from the north, west, and south. The mean water depth ensures deepwater wave conditions for waves with lengths shorter than about 400 m (1,312 ft), or frequencies higher than about 0.06 Hz. Spectra reported herein are processed at frequencies between 0.04 and 0.16 Hz, so it is likely that directional spectra for frequencies between 0.04 and 0.06 Hz are affected somewhat by refraction.

Directional wave detection is achieved with a spatial array of six subsurface pressure gauges mounted on the Harvest Platform framework. Figure 2 shows a plan view of relative gauge positions, and the array orientation in a geophysical reference frame. Gauge spacing takes advantage of the maximum horizontal dimensions of Harvest Platform, and allows directional estimation for waves in the frequency band noted in the previous paragraph. All gauges are mounted at a depth of 15.72 m (51.57 ft) below mean sea level, which ensures they will not protrude through the sea surface under extreme wave conditions that have been observed at this site.[1] To avoid aliasing in directional estimation, the lower resolution wavelength limit is two times the shortest lag spacing of the array. In the Harvest Platform array, this limit is 45.4 m (149.0 ft), which corresponds to a wave frequency of about 0.18 Hz. Signal analysis used in this report was limited further to 0.16 Hz to be conservatively clear of aliasing effects.

Pressure Gauges and Data Path

Individual sensors were Model TJE absolute pressure sensors manufactured by Sensotec Transducer Company with operating ranges of 0 to 100 psia (0 to 689.5 kPa), and a manufacturer's stated accuracy of ±0.1 percent of full scale. The six gauges on Harvest Platform were sampled simultaneously at 1 Hz,

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[1] Personal communication, 1991, Dr. R. J. Seymour, Coastal Data Information Program (CDIP), Scripps Institution of Oceanography (SIO).
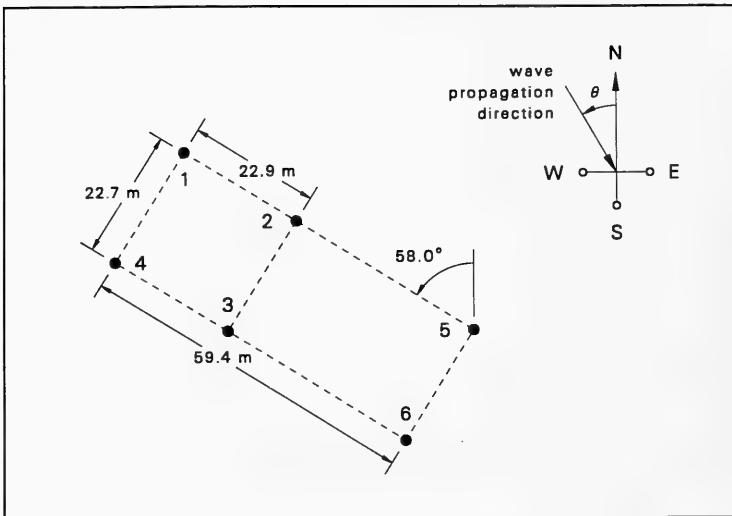
Figure 2. Dimensions and orientation of the Harvest Platform array

digitized, and then fed to a concentrator where the set of samples was buffered. Buffered signals were periodically transmitted to shore through a telephone connection, and ultimately stored as collection files on the main computer of the CDIP, Ocean Engineering Research Group, SIO, La Jolla, CA. Each collection time series is 8,192 sec (2 hr 16 min 32 sec) in length.

Data processing for results presented in this report was not performed at the CDIP site, and so is independent of the processing done and published by that group (*Monthly reports*, Coastal Data Information Program). Data collections were transferred to the Field Research Facility (FRF) of the U.S. Army Engineer Waterways Experiment Station's Coastal Engineering Research Center for processing by high-resolution techniques that are different from those used by CDIP. Data transfer was accomplished over an electronic network.

Collection Schedule and Data Set Size

Collections were made eight times daily, at approximately 3-hr intervals. Nominal collection start times were 0200, 0500, 0800, 1100, 1400, 1700, 2000, and 2300 GMT. Actual collection start times varied by several minutes on either side of these nominal start times because the amount of time required to establish a phone link varied from collection to collection. There are several periods of several days duration where collections are virtually continuous. These occur when CDIP shifts to a collection mode intended to detect tsunami waves, and result in 12 directional spectral estimates daily instead of the normal eight.

Of the possible 2,920 collections during calendar year 1994 (assuming eight collections per day), a total of 2,320 collections were acquired and processed as frequency-direction spectra. A number of collections were lost because of the inability to establish or maintain electrically clean phone links to the concentrator on Harvest Platform. An additional number of collections were not processed because data did not satisfy error-checking constraints described in Chapter 3 of this report.

3   Primary Data Analysis

Primary data processing was done by checking data quality through a series of spectral intercomparisons, and, for data of sufficient quality, computing frequency-direction spectra. All steps rely on Fourier analysis of pressure gauge time series data, and subsequent computation of cross-spectral densities. A discussion of error-checking procedures then leads logically to the subsequent steps involved in frequency-direction spectral computation.

Error Checking

The first step in data processing is computation of discrete estimates of frequency autospectra of pressure signals, and surface-corrected cross-spectral densities of signals from all pairs of gauges. Cross spectra are denoted in complex form as $C_{ij}(f_n) - iQ_{ij}(f_n)$, where $C_{ij}(f_n)$ is the coincident spectrum, $Q_{ij}(f_n)$ is the quadrature spectrum, i and j (as subscripts) are indices ranging in value from 1 to 6 that refer to the gauge numbers shown in Figure 2, and f_n is the nth of a set of N discrete frequencies.[1] Frequency autospectra are denoted $S(f_n)$, and, if surface corrected with the linear wave pressure response functions (Dean and Dalrymple 1984), are identically equal to $C_{ii}(f_n)$. All spectra are computed using Welch's method (Welch 1967) with standard Fourier analysis techniques (Bendat and Piersol 1971).

In a collection, the 8,192-sec time series from each gauge is analyzed in 15 half-lapped segments of 1,024 sec duration. Each segment is demeaned, tapered with a variance-preserving window, and converted to the frequency domain with a discrete Fourier transform. At this point, the analysis is split into two parts: estimates of pressure autospectra from each gauge at depth, and estimates of surface-corrected cross spectra of sea surface displacement. Raw cross-spectral estimates are formed for all gauge pairs using temporally corresponding transformed segments of pressure data corrected to represent sea surface displacement. Raw autospectral estimates are formed for each of the 15 transform segments for each individual gauge. At the error-checking stage, autospectral estimates are not surface corrected.

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[1] For convenience, symbols and abbreviations are listed in the notation (Appendix E).

For both autospectra and cross spectra, smooth estimates are formed by averaging raw estimates over all 15 segments, and averaging results over 10 adjacent frequency bands. Final resolution frequency bandwidth is $df = 0.00977$ Hz, and the pass band of frequencies ranges from 0.044 to 0.162 Hz, which corresponds to ($N =$) 13 discrete frequency bands. Degrees of freedom for spectral estimates range from 160 to about 200, depending on the extent to which the second halves of time series segments are correlated with the first halves (Welch 1967).

Autospectral intercomparisons

One part of error checking is a graphic intercomparison of signal means and autospectra, an example of which is shown in the lower left graph of Figure 3. Frequency autospectral estimates of data from all six pressure gauges are plotted on the same set of axes from the first resolvable frequency band out to the temporal Nyquist frequency. If a pressure gauge is malfunctioning, its autospectrum will deviate obviously from the main group of curves.

The small inset graph in the lower left graph of Figure 3 is an analysis of signal means. The closely packed group of symbols of nearly constant value represents the deviations of the segment means from the median of the set of segment means for each of the 15 segments. If a gauge develops signal drift problems, it will be obvious as a symbol that deviates from the main group of symbols. Triangle symbols in the small inset graph show the deviation of the indicated water surface from mean sea level (gauge height off the bottom plus median of gauge mean depths for each segment minus the total long-term mean ocean depth of 202 m), and is therefore an indication of tide stage at Harvest Platform for each of the 15 segments in a collection.

Coherence and phase comparisons

The next step in error checking is computation of a dimensionless cross spectrum $M_{ij}(f_n)$, defined by

$$M_{ij}(f_n) = \frac{C_{ij}(f_n) - i Q_{ij}(f_n)}{\sqrt{C_{ii}(f_n)} \sqrt{C_{jj}(f_n)}} \tag{1}$$

Equation 1 is used in error checking in the form of coherence and phase estimates. Coherence of signals from gauges i and j at discrete frequency f_n is

$$\Gamma_{ij}^2(f_n) = | M_{ij}(f_n) |^2 \tag{2}$$

Signal phase difference of gauge i relative to gauge j at frequency f_n is

$$\phi_{ij}(f_n) = \tan^{-1} \left(\frac{\mathrm{Im}\,[M_{ij}(f_n)]}{\mathrm{Re}\,[M_{ij}(f_n)]} \right) \tag{3}$$
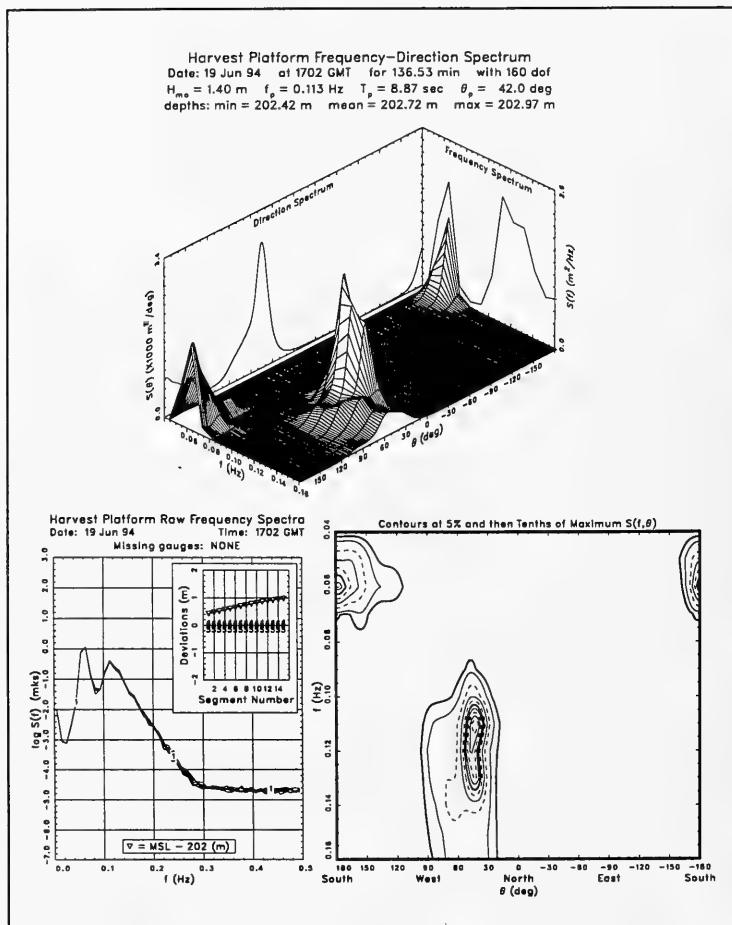
Figure 3. Autospectral intercomparison and frequency-direction spectral estimate

where Re[ ] and Im[ ] are the real and imaginary parts, respectively, of the entity contained in square brackets.

Signals from multiple pairs of gauges having redundant lag (or spatial separation) vectors in a uniform wave field are expected to have identical cross spectra. In the Harvest Platform array there are several such sets of pairs as can be seen in Figure 2. In terms of coherences and phases, one would expect

$$\Gamma_{14}(f_n) = \Gamma_{23}(f_n) = \Gamma_{56}(f_n) \qquad \phi_{14}(f_n) = \phi_{23}(f_n) = \phi_{56}(f_n) \qquad (4)$$

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as well as

$$\Gamma_{12}(f_n) = \Gamma_{43}(f_n) \qquad \phi_{12}(f_n) = \phi_{43}(f_n) \qquad (5)$$

and

$$\Gamma_{15}(f_n) = \Gamma_{46}(f_n) \qquad \phi_{15}(f_n) = \phi_{46}(f_n) \qquad (6)$$

Figure 4 is an example of coherence and phase comparisons, showing graphs of the functions named in Equations 4, 5, and 6 (upper, middle, and lower sets of graphs in Figure 4, respectively). This type of error checking is useful for isolating cases where a data point is dropped during telephone transmission from the data buffer, resulting in an apparent temporal shift of data from one gauge relative to data from the other gauges. Such a shift causes a significant phase error in cross spectra, and is readily apparent in a graphic display like Figure 4.

The combined effects of intercomparing frequency autospectra and coherence and phase functions for the pressure gauge array on Harvest Platform provide clear indications of faulty or suspect data. When such conditions are detected in a collection, frequency-direction spectra are not computed. Such rigorous examination of the data ensures that only high-quality time series are used in directional estimation.

Frequency-Direction Spectra

Estimates of frequency-direction spectra are made using the iterative maximum likelihood estimator (IMLE) developed by Pawka (1983). Estimates are made by iterative approximations of directional distribution functions $D(f_n, \theta_m)$, which are related to corresponding frequency-direction spectra $S(f_n, \theta_m)$ by

$$D(f_n, \theta_m) = \frac{S(f_n, \theta_m)}{S(f_n)} \qquad (7)$$

where θ_m is a discrete angle indicating the direction from which wave energy arrives, measured counterclockwise from true north (Figure 2), and $S(f_n)$ is the (surface-corrected) frequency spectrum. The direction index m ranges from $m = 1$ to $m = M = 181$, while direction ranges from $\theta_1 = -180$ deg to $\theta_{181} = 180$ deg in steps of $d\theta = 2$ deg. The directional distribution function has the property

$$\sum_{m=1}^{M} D(f_n, \theta_m) \, d\theta = 1 \qquad (8)$$

which must be satisfied in all estimates.
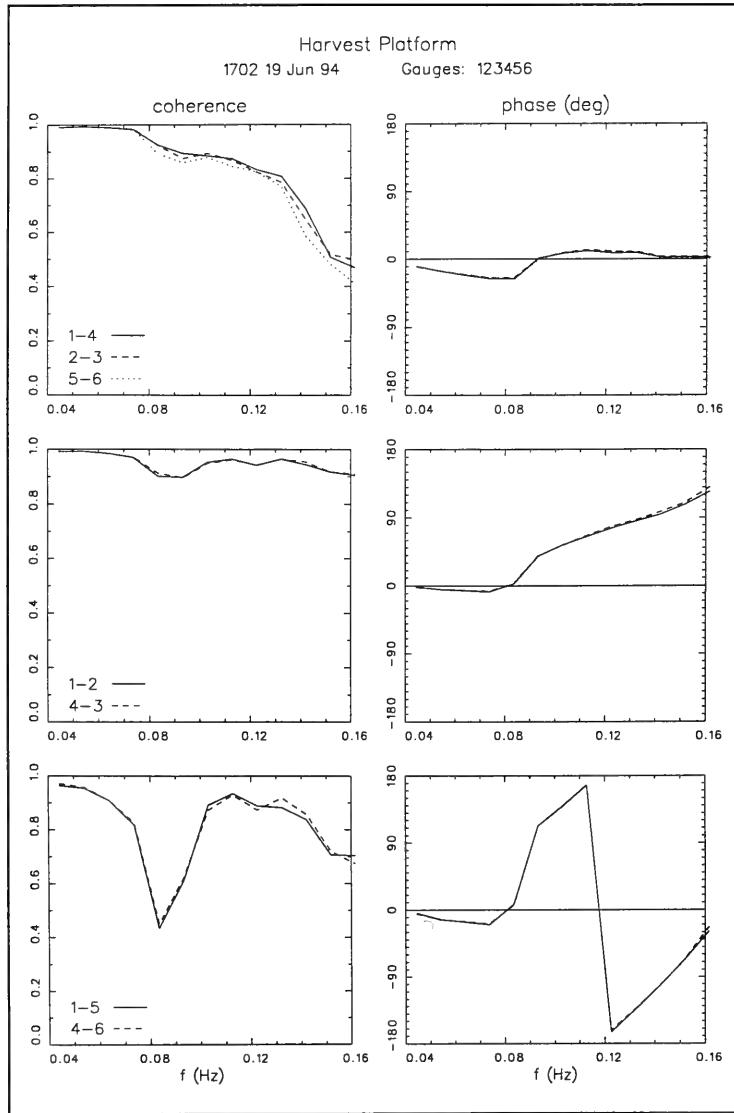
Figure 4. Sample coherence and phase function comparisons

The lowest order estimate is the maximum likelihood estimate described by Davis and Regier (1977), which takes the form

$$D_0(f_n, \theta_m) = \frac{a_0}{d\theta \sum\limits_{i=1}^{I} \sum\limits_{j=1}^{I} M_{ij}^{-1}(f_n) \, e^{\, i\vec{k}_n(\theta_m)\cdot(\vec{x}_i - \vec{x}_j)}} \qquad (9)$$

where a_0 is a factor of order 1 that is used to satisfy Equation 8, I is the number of gauges, the $M_{ij}^{-1}(f_n)$ are elements of the inverse of the dimensionless cross-spectral matrix defined by Equation 1, $\vec{k}_n(\theta_m)$ is the wave number vector, and $\vec{x}_i$ and $\vec{x}_j$ are coordinate position vectors of gauges i and j, respectively. The wave number vector $\vec{k}_n(\theta_m)$ is

$$\vec{k}_n(\theta_m) = k_n \cos\theta_m \, \hat{e}_x + k_n \sin\theta_m \, \hat{e}_y \qquad (10)$$

where $\hat{e}_x$ and $\hat{e}_y$ are spatial coordinate unit vectors in the x- and y-directions, respectively, and k_n is wave number vector magnitude, which is related with gravitational acceleration g to frequency f_n and water depth d through the linear wave dispersion relation

$$4\pi^2 f_n^2 = g k_n \tanh k_n d \qquad (11)$$

As used in this report, horizontal coordinates are such that x increases to the north, and y increases to the west.

An IMLE result is achieved by iterating through several computational steps. At the rth iteration, an estimate $^r M_{ij}(f_n)$ of the observed cross-spectral matrix $M_{ij}(f_n)$ is computed from the previous directional distribution function estimate $D_{r-1}(f_n, \theta_m)$ by

$$^r M_{ij}(f_n) = \sum\limits_{m=1}^{M} D_{r-1}(f_n, \theta_m) \, e^{\, i\vec{k}_n(\theta_m)\cdot(\vec{x}_i - \vec{x}_j)} \, d\theta \qquad (12)$$

A new intermediate directional distribution function estimate $D_r'(f_n, \theta_m)$ is computed using the cross-spectral matrix of Equation 12 in the expression

$$D_r'(f_n, \theta_m) = \frac{a_r}{d\theta \sum\limits_{i=1}^{I} \sum\limits_{j=1}^{I} {}^r M_{ij}^{-1}(f_n) \, e^{\, i\vec{k}_n(\theta_m)\cdot(\vec{x}_i - \vec{x}_j)}} \qquad (13)$$

where a_r is adjusted so that Equation 8 is satisfied for $D_r'(f_n, \theta_m)$. A correction is found for $D_r'(f_n, \theta_m)$ by first computing

$$\lambda_r(f_n, \theta_m) = 1 - \frac{D_r'(f_n, \theta_m)}{D_0(f_n, \theta_m)} \tag{14}$$

and then finding a new directional distribution function estimate $D_r(f_n, \theta_m)$ from

$$D_r(f_n, \theta_m) = D_r'(f_n, \theta_m) \left[1 + \frac{|\lambda_r(f_n, \theta_m)|^{\beta+1}}{\gamma \lambda_r(f_n, \theta_m)} \right] \tag{15}$$

The parameters β and γ in Equation 15 control the rate of convergence of the estimator. As used by Pawka (1983), the values $\beta = 1$ and $\gamma = 5$ were used for all estimates discussed in this report.

In each iterative loop, a convergence check ϵ_r is computed as the sum of the squares of the magnitudes of the differences of elements of the estimated cross spectrum of Equation 12 and the measured cross spectrum of Equation 1. This takes the form

$$\epsilon_r = \sum_{i=1}^{I} \sum_{j=1}^{I} |{}^r M_{ij}(f_n) - M_{ij}(f_n)|^2 \tag{16}$$

Iteration continues as long as ϵ_r decreases between successive iterations, or until an upper limit R of iterations has been completed. In computations reported herein, $R = 30$.

Equations 9 to 16 form the basis of the IMLE technique. For the iteration r that satisfies the convergence check, the frequency-direction spectrum at frequency f_n is formed from

$$S(f_n, \theta_m) = S(f_n) D_r(f_n, \theta_m) \tag{17}$$

The complete frequency-direction spectrum is formed when Equations 9 through 17 are evaluated for all frequencies.

An example of such a spectrum is illustrated in Figure 3. The upper graph is a three-dimensional plot of $S(f_n, \theta_m)$, and the lower right graph is a contour plot of the spectrum. The right panel in the three-dimensional plot is a linear graph of the discrete frequency spectrum $S(f_n)$, which is related to the frequency-direction spectrum through Equations 7 and 8 by

$$S(f_n) = \sum_{m=1}^{M} S(f_n, \theta_m) \, d\theta \tag{18}$$

The left panel in the three-dimension plot is a linear graph of the direction spectrum $S(\theta_m)$, which is the directional analog of the frequency spectrum. The direction spectrum is defined by

$$S(\theta_m) = \sum_{n=1}^{N} S(f_n, \theta_m) \, df \tag{19}$$

Because $S(\theta_m)$ represents total wave energy in each direction bin, it is a particularly useful function from which to derive direction-sensitive characterizing parameters for a given frequency-direction spectrum as a whole. A set of such characterizing parameters is defined in Chapter 4.

4   Characterizing Parameters

To effect a summary description of the Harvest Platform database, frequency-direction spectra are characterized with a set of parameters. These descriptors are called bulk parameters because they are derived from extremal or integral properties of spectra, and so represent only part of the frequently more complicated directional structure of the wind wave field. A more exhaustive treatment of directional spectral structure at Harvest Platform is given by Long (1995b). For the purposes of the present report, nine parameters are used. These parameters are: characteristic wave height, peak frequency, two measures of characteristic direction, two measures of directional spread, two measures of asymmetry of directionally distributed wave energy, and a measure of kurtosis of directional distributions. This chapter contains the mathematical definitions of these parameters.

Wave Height, Peak Frequency, and Peak Direction

Characteristic wave height H_{mo} is defined using the conventional definition of four times the standard deviation of sea surface displacement. H_{mo} can be defined in terms of the full frequency-direction spectrum, the frequency spectrum defined by Equation 18, or the direction spectrum defined by Equation 19. A definition that relates all of these entities is

$$\frac{H_{mo}^2}{16} = \sum_{m=1}^{M} \sum_{n=1}^{N} S(f_n, \theta_m) \, df \, d\theta = \sum_{n=1}^{N} S(f_n) \, df = \sum_{m=1}^{M} S(\theta_m) \, d\theta \qquad (20)$$

It should be noted that H_{mo} reported herein is lower than what would be found in conventional analysis because directional computations were truncated at 0.16 Hz instead of the nominal 0.3-Hz limit for wind waves. Consequently, contributions to H_{mo} from high-frequency parts of wind wave spectra are not represented.

Peak frequency f_p is defined as the discrete frequency at which the frequency spectrum $S(f_n)$ is maximum. This definition is conventional, in that it is the usual characteristic frequency defined for nondirectional gauges. For convenience, Appendix A lists both f_p and its inverse, peak period T_p ($= 1/f_p$).

Peak direction θ_p is defined as the direction of maximum variance density in the directional distribution associated with the peak frequency. In symbols, θ_p is the discrete direction at which $S(f_p, \theta_m)$ is a maximum. It is interpreted as the direction of the most energetic waves at the frequency containing the greatest overall energy.

Circular Moment Parameters

Kuik, van Vledder, and Holthuijsen (1988) proposed a useful set of parameters that define mean wave direction, directional spread, skewness, and kurtosis based on circular moments of directional distribution functions. Though derived for directional distributions at individual frequencies, the definitions can be applied to any directional distribution function. For the purposes of characterizing a frequency-direction spectrum as a whole, the direction spectrum $S(\theta_m)$, as defined by Equation 19, is used herein because it represents total wave energy in any given direction arc.

To define a directional distribution function (one that integrates to unit area) from the direction spectrum, $S(\theta_m)$ must be normalized by its own area. By Equation 20, this area is identically $\frac{1}{16} H_{mo}^2$, so the appropriate directional distribution function is

$$D(\theta_m) = \frac{16}{H_{mo}^2} S(\theta_m) \qquad m = 1, 2, \dots, M \qquad (21)$$

Circular moments in terms of $D(\theta_m)$ adapted from definitions by Kuik, van Vledder, and Holthuijsen (1988) are

$$m_1 = \sum_{m=1}^{M} \cos(\theta_m - \theta_0) D(\theta_m) \, d\theta \qquad (22)$$

$$n_1 = \sum_{m=1}^{M} \sin(\theta_m - \theta_0) D(\theta_m) \, d\theta \qquad (23)$$

$$m_2 = \sum_{m=1}^{M} \cos(2\theta_m - 2\theta_0) D(\theta_m) \, d\theta \qquad (24)$$

$$n_2 = \sum_{m=1}^{M} \sin(2\theta_m - 2\theta_0) D(\theta_m) \, d\theta \qquad (25)$$

where θ_0 is the mean direction defined by requiring $n_1 = 0$. With this constraint, Equation 23 can be solved to find

$$\theta_0 = \tan^{-1} \left[\frac{\sum_{m=1}^{M} D(\theta_m) \sin \theta_m \, d\theta}{\sum_{m=1}^{M} D(\theta_m) \cos \theta_m \, d\theta} \right] \tag{26}$$

With θ_0 determined by Equation 26, moments m_1, m_2, and n_2 can be computed from Equations 22, 24, and 25, respectively.

Kuik, van Vledder, and Holthuijsen (1988) define a measure of directional spread (herein called *circular width*) σ as

$$\sigma = (2 - 2\dot{m}_1)^{1/2} \tag{27}$$

a measure of asymmetry of a directional distribution (*circular skewness*) γ as

$$\gamma = \frac{-n_2}{\left(\frac{1}{2} - \frac{1}{2} m_2 \right)^{3/2}} \tag{28}$$

and a measure of the flatness of a directional distribution (*circular kurtosis*) δ as

$$\delta = \frac{6 - 8 m_1 + 2 m_2}{\left(2 - 2 m_1 \right)^2} \tag{29}$$

Quartile Parameters

Two parameters that are modestly more intuitive than the corresponding circular parameters, and are also useful for characterizing spread and asymmetry in directional distribution function are the *quartile spread* $\Delta\theta$ and *quartile asymmetry* A used by Long and Oltman-Shay (1991). The concept is based on the fact that any directional distribution function integrates to unity such that an integral from the direction of minimum energy $\theta_{m_{min}}$ (where m_{min} is the discrete direction index at which minimum energy occurs) to any arbitrary angle creates a function $I(\theta_m - \theta_{m_{min}})$ that increases monotonically from zero to an upper limit of unity. The directions at which this integral (interpolated as necessary from discrete data) has the values $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ are the first quartile, median, and third quartile directions of the directional distribution, respectively. Differences among these directions then provide information about the spread and asymmetry of the distribution.

Using $D(\theta_m)$ as a representative directional distribution function, the integral function is

$$I(\theta_m - \theta_{m_{min}}) = \sum_{l=m_{min}}^{m} D(\theta_l) \, d\theta \tag{30}$$

where the cyclic nature of the distribution function is employed if necessary. Quartile directions satisfy

$$I(\theta_{25\%} - \theta_{m_{min}}) = 0.25 \tag{31}$$

$$I(\theta_{50\%} - \theta_{m_{min}}) = 0.50 \tag{32}$$

and

$$I(\theta_{75\%} - \theta_{m_{min}}) = 0.75 \tag{33}$$

A measure of directional spread $\Delta\theta$ is the span of the two middle quartiles

$$\Delta\theta = \theta_{75\%} - \theta_{25\%} \tag{34}$$

and has the specific interpretation that it is the arc subtending the central 50 percent of the energy distribution.

A measure of asymmetry of a distribution is the ratio of the directional width of the third quartile to that of the second quartile. By taking the natural logarithm of this ratio, a symmetric distribution has an asymmetry parameter A near zero, and that for a skewed distribution acquires a positive or negative sign if the skewness is toward larger or smaller angles, respectively. The asymmetry parameter is thus defined as

$$A = \ln\left[\frac{\theta_{75\%} - \theta_{50\%}}{\theta_{50\%} - \theta_{25\%}}\right] \tag{35}$$

Summary of Parameters

The nine bulk parameters (H_{mo}, f_p, θ_p, θ_0, σ, γ, δ, $\Delta\theta$, and A) defined here are useful for classifying general wind wave energy distributions. For reference as an index of processed data from the 1994 collection year, these parameters are listed in Appendix A, and plotted as time series in Appendix B. Graphs in Appendix B provide an overview of the directional wave climate at Harvest Plat-

form, and specific parametric values can be determined from the listing in Appendix A. An evaluation of the accuracy of these parameters, relationships among these parameters, and examples of frequency-direction spectra classified by ranges of these parameters are given by Long (1995b).

5 Accessing Spectra

Frequency-direction spectra computed from Harvest Platform data are currently stored on electro-optical media in binary, unformatted form, and so are not "on line" in the sense of common data networks. Nonetheless, an individual interested in obtaining these spectra can readily do so by communicating with the FRF via:

Surface mail Chief, Field Research Facility
1261 Duck Road
Kitty Hawk, NC 27949-4472

Telephone (919) 261-3511

FAX (919) 261-4432

or any of the following internet addresses:

C.Long@duck.wes.army.mil
C.Baron@duck.wes.army.mil
W.Birkemeier@duck.wes.army.mil

On request, all or part of the spectral database can be converted to 80-column ASCII format and copied either to portable magnetic tape media or to an anonymous file transfer protocol (ftp) account that is accessible through common computer networks. Data will be in the form of a set of files with one spectral estimate per file. Files will be named HP*yymmddhhmm*.ASC, where *yymmdd* represents year, month, and day, and *hhmm* represents hour and minute (GMT) of a collection start time from which a spectrum is estimated. For convenience, dates and times of parameter listings in Appendix A are in the *yymmdd* and *hhmm* mnemonic forms.

On receipt by a user, spectral data files can be read using the format statements shown in the sample FORTRAN program listed in Appendix C. The header of the FORTRAN program listing identifies all the variables contained in a data file. For reference, Appendix D is a listing of a sample data file, and shows locations of variables within the file.

6 Summary

This is the second of a series of reports describing results from a high-resolution directional wave gauge installed on the Texaco Oil Company Harvest Platform. The purpose of this gauge is long-term monitoring of the directional wind wave climate at a deepwater site that can be used to represent open ocean conditions for waves approaching the coast of southern California. This report indexes parameters of and describes a means of access to 2,320 frequency-direction spectral observations made during calendar year 1994.

The primary intent of this report is to publicize these observations so that they can be used by researchers interested in seaward boundary conditions in coastal wave propagation models, studies of ocean wave evolution, comparison studies with locally deployed low-resolution directional wave gauges, and ground truth in remote sensing research. Improved knowledge resulting from such studies will enhance abilities to model the physics of open ocean wave processes, and the consequent nearshore wave climate required in coastal engineering computations as such waves propagate landward.

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Appendix A
Table of Collection Times and Bulk Parameters

Table A1
Collection Times and Bulk Parameters

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940101	0159	1.92	0.074	13.6	58	78	0.56	0.64	4.05	43	0.32
940101	0459	1.97	0.074	13.6	56	75	0.55	0.62	4.32	40	0.21
940101	0759	1.91	0.074	13.6	60	74	0.54	0.72	4.42	38	0.49
940101	1059	1.84	0.083	12.0	62	78	0.52	0.65	4.81	36	0.38
940101	1659	1.70	0.074	13.6	58	78	0.56	0.50	4.06	43	0.18
940101	1959	1.55	0.083	12.0	56	75	0.59	0.64	4.34	42	0.14
940102	0159	1.62	0.083	12.0	58	74	0.53	0.73	5.13	34	0.05
940102	0459	1.81	0.083	12.0	58	75	0.51	0.71	5.08	35	0.10
940103	0054	2.48	0.064	15.6	72	75	0.44	0.34	6.35	28	0.15
940103	0459	3.01	0.064	15.6	70	71	0.37	0.59	10.36	15	0.24
940103	0759	3.04	0.064	15.6	68	71	0.37	0.35	10.17	15	0.30
940103	1100	2.99	0.074	13.6	68	72	0.41	0.83	8.47	18	0.24
940103	1400	2.87	0.064	15.6	72	74	0.42	0.53	7.43	22	0.13
940103	1704	2.78	0.064	15.6	70	72	0.42	0.59	8.14	20	0.23
940103	2000	2.90	0.064	15.6	68	70	0.40	0.71	8.53	20	0.19
940104	0802	2.84	0.064	15.6	74	72	0.45	0.54	6.78	25	-0.14
940104	1100	2.55	0.064	15.6	72	72	0.48	0.58	5.82	28	-0.12
940104	1358	2.48	0.064	15.6	72	74	0.47	0.51	5.57	28	0.09
940104	1713	2.42	0.064	15.6	74	73	0.48	0.65	5.50	29	0.05
940104	1956	2.39	0.074	13.6	60	73	0.47	0.66	5.66	28	0.26
940105	0158	2.41	0.074	13.6	54	70	0.53	0.61	4.76	36	0.33
940105	0501	2.50	0.074	13.6	56	63	0.52	0.39	4.69	33	0.28
940105	0758	2.59	0.064	15.6	80	62	0.55	0.26	4.02	40	-0.17
940105	1100	2.41	0.074	13.6	58	64	0.54	0.46	4.23	38	-0.01
940105	1359	2.58	0.074	13.6	56	62	0.51	0.51	4.30	36	0.23
940105	1951	3.62	0.123	8.2	56	55	0.46	0.16	4.27	34	-0.09
940106	0200	2.89	0.113	8.9	54	57	0.47	0.59	5.27	31	0.12
940106	0500	2.45	0.113	8.9	48	57	0.46	0.77	5.78	31	0.32
940106	1400	2.23	0.083	12.0	56	58	0.42	0.70	7.11	27	0.05

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940106	1704	2.28	0.083	12.0	50	59	0.44	0.72	6.50	31	0.24
940107	0804	1.68	0.093	10.7	50	51	0.49	1.08	6.78	28	0.01
940107	1057	1.55	0.093	10.7	50	52	0.48	1.44	7.00	22	0.03
940107	1401	1.38	0.093	10.7	52	55	0.50	1.40	6.40	25	-0.01
940107	1707	1.39	0.103	9.7	54	55	0.51	1.12	5.63	29	-0.03
940107	1958	1.27	0.093	10.7	48	55	0.51	1.34	6.10	28	0.39
940108	0503	1.01	0.103	9.7	56	61	0.60	1.49	5.15	30	0.24
940108	0801	0.87	0.103	9.7	54	65	0.67	1.22	4.21	41	0.61
940108	1403	0.88	0.113	8.9	56	64	0.63	1.87	4.96	31	0.37
940108	1703	0.80	0.074	13.6	58	65	0.67	1.33	3.89	40	0.52
940108	2001	0.76	0.074	13.6	54	71	0.73	1.09	3.26	49	0.57
940109	0203	1.05	0.162	6.2	26	52	0.61	0.98	4.12	46	0.07
940109	0503	1.09	0.162	6.2	50	56	0.59	1.08	4.53	40	0.31
940109	0803	1.27	0.162	6.2	54	59	0.52	1.14	6.36	27	0.23
940109	1101	1.79	0.064	15.6	58	59	0.49	1.01	7.02	20	-0.02
940109	1353	2.67	0.074	13.6	60	61	0.38	0.61	10.14	15	0.02
940109	1704	3.02	0.064	15.6	64	61	0.38	0.41	8.64	19	-0.12
940109	2003	2.99	0.074	13.6	54	60	0.43	0.76	8.42	22	0.11
940110	0159	2.92	0.074	13.6	56	58	0.43	0.49	7.56	23	0.11
940110	0459	2.81	0.074	13.6	56	58	0.42	0.40	7.89	22	0.06
940110	0759	2.76	0.074	13.6	56	58	0.45	0.74	7.10	25	0.14
940110	1056	2.42	0.083	12.0	52	60	0.48	0.97	6.76	27	0.47
940110	1645	1.96	0.083	12.0	58	62	0.52	1.04	5.95	28	0.29
940111	0159	1.64	0.093	10.7	62	69	0.53	1.30	5.78	28	0.32
940111	0459	1.54	0.093	10.7	58	67	0.52	1.24	5.86	28	0.45
940111	0759	1.51	0.093	10.7	54	63	0.55	1.36	5.48	28	0.50
940111	1111	1.41	0.103	9.7	56	66	0.57	1.46	5.51	30	0.40
940111	1351	1.48	0.103	9.7	60	65	0.60	1.26	4.99	31	0.29
940111	1722	1.46	0.152	6.6	58	62	0.59	1.39	5.30	31	0.12
940111	1959	1.53	0.152	6.6	64	62	0.50	1.05	6.36	27	-0.18
940112	0159	1.55	0.064	15.6	56	63	0.54	1.14	5.60	32	0.08
940112	0459	1.49	0.064	15.6	66	63	0.53	1.45	6.69	27	-0.08
940112	0759	1.48	0.064	15.6	54	61	0.58	1.53	5.81	31	0.22
940112	1105	1.65	0.074	13.6	56	64	0.53	1.66	6.87	24	0.45
940112	1409	1.76	0.074	13.6	58	63	0.48	1.48	7.84	23	0.27
940112	1708	1.88	0.074	13.6	60	63	0.49	1.45	7.61	24	0.14
940112	2003	1.68	0.074	13.6	58	61	0.51	1.75	7.23	22	0.23
940113	0202	1.55	0.074	13.6	54	59	0.55	1.43	5.79	28	0.30
940113	0504	1.52	0.083	12.0	52	60	0.58	1.55	5.79	31	0.34
940113	0804	1.42	0.083	12.0	58	61	0.57	2.05	6.53	22	0.16
940113	1403	1.39	0.054	18.5	52	63	0.62	1.78	5.35	29	0.23
940113	1703	1.42	0.054	18.5	58	65	0.57	1.72	5.88	26	0.03
940113	2003	1.43	0.064	15.6	64	66	0.60	1.65	5.41	28	-0.03
940114	0205	1.55	0.064	15.6	66	68	0.48	1.43	7.60	18	0.09
940114	0505	1.42	0.064	15.6	70	69	0.54	1.31	6.11	27	-0.17
940114	0805	1.32	0.064	15.6	70	72	0.54	1.51	6.34	27	-0.04
940114	1102	1.41	0.064	15.6	62	69	0.56	1.31	5.87	31	0.29
940114	1410	1.49	0.064	15.6	64	68	0.53	1.25	6.19	29	0.16
940114	1712	1.58	0.064	15.6	68	68	0.46	1.28	7.37	26	-0.09
940114	2004	1.61	0.064	15.6	70	70	0.49	1.33	6.60	27	0.12
940115	0204	1.61	0.064	15.6	70	73	0.49	1.04	6.71	23	0.15

(Sheet 2 of 45)

Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940115	0504	1.58	0.064	15.6	70	74	0.52	1.04	5.77	31	0.15
940115	0804	1.46	0.064	15.6	58	72	0.52	0.92	5.80	32	0.21
940115	1104	1.59	0.064	15.6	68	74	0.54	1.04	5.53	33	0.25
940115	1359	1.73	0.064	15.6	68	75	0.50	0.76	5.99	31	0.31
940115	1700	1.85	0.064	15.6	74	74	0.46	0.81	6.51	29	0.02
940115	1959	1.71	0.064	15.6	72	75	0.51	0.92	5.51	32	0.11
940116	0200	1.93	0.074	13.6	56	70	0.50	0.63	5.09	34	0.31
940116	0800	1.91	0.074	13.6	56	68	0.50	0.68	5.73	32	0.16
940116	1100	1.90	0.074	13.6	58	67	0.50	0.91	5.59	30	0.44
940116	1956	1.83	0.074	13.6	54	67	0.54	1.20	5.01	36	0.90
940117	0200	1.58	0.083	12.0	56	79	0.59	0.59	3.83	47	0.39
940119	0205	1.82	0.064	15.6	84	86	0.49	0.44	6.16	25	0.06
940119	0505	1.82	0.064	15.6	82	85	0.50	0.48	5.50	29	0.17
940119	0802	1.70	0.064	15.6	86	86	0.51	0.60	5.70	30	-0.01
940119	1106	1.73	0.064	15.6	82	87	0.50	0.51	5.18	32	0.16
940119	1704	1.55	0.064	15.6	84	88	0.57	0.33	4.07	41	-0.06
940119	1959	1.42	0.074	13.6	56	89	0.65	0.51	3.39	54	-0.12
940120	0201	1.35	0.074	13.6	90	91	0.62	0.29	3.51	50	0.08
940120	0503	1.29	0.074	13.6	88	85	0.59	0.73	4.43	40	0.07
940120	0805	1.18	0.074	13.6	94	86	0.62	0.45	3.77	45	-0.19
940120	1103	1.16	0.074	13.6	58	91	0.64	0.39	3.36	53	-0.18
940120	1407	1.10	0.074	13.6	92	93	0.63	0.50	3.61	50	0.13
940120	1703	1.06	0.074	13.6	56	90	0.66	0.42	3.04	57	-0.10
940120	2008	1.04	0.083	12.0	56	91	0.67	0.36	2.99	57	-0.20
940121	0206	0.98	0.083	12.0	94	94	0.66	0.43	3.23	50	-0.01
940121	0507	0.95	0.083	12.0	68	93	0.65	0.35	3.35	52	0.14
940121	0807	0.95	0.083	12.0	74	93	0.66	0.33	3.34	51	0.25
940121	1108	1.08	0.054	18.5	70	87	0.60	0.85	4.08	38	0.33
940121	1407	1.30	0.064	15.6	68	85	0.60	0.76	4.05	39	0.39
940121	1705	1.57	0.064	15.6	68	83	0.51	0.60	5.11	34	0.27
940121	2008	1.74	0.064	15.6	62	81	0.54	0.60	4.57	40	0.60
940122	0205	1.84	0.064	15.6	64	80	0.53	0.72	4.54	37	0.79
940122	0507	1.85	0.064	15.6	64	77	0.52	0.95	5.02	33	1.04
940122	0806	1.97	0.064	15.6	64	74	0.52	1.02	5.38	29	0.75
940122	1106	2.10	0.064	15.6	62	72	0.50	1.04	5.46	29	0.82
940122	1406	2.04	0.064	15.6	64	71	0.55	1.03	4.94	34	0.55
940122	1707	2.03	0.074	13.6	50	70	0.57	0.91	4.24	41	0.65
940122	2007	2.00	0.074	13.6	56	69	0.55	1.13	4.98	36	0.83
940123	0207	1.95	0.074	13.6	48	73	0.58	0.70	3.83	47	0.27
940123	0507	1.90	0.074	13.6	80	75	0.57	0.52	4.28	42	-0.08
940123	0805	1.97	0.074	13.6	52	74	0.54	0.56	4.45	41	0.19
940123	1107	2.21	0.074	13.6	54	73	0.56	0.69	4.55	40	0.21
940123	1407	2.11	0.074	13.6	52	75	0.57	0.58	4.09	45	0.26
940123	1707	2.01	0.074	13.6	54	76	0.59	0.48	3.76	48	0.24
940123	2007	2.07	0.074	13.6	54	76	0.56	0.52	3.72	45	0.25
940124	0203	2.13	0.083	12.0	58	76	0.56	0.47	4.20	43	0.17
940124	0506	2.05	0.083	12.0	54	78	0.54	0.39	3.98	43	-0.05
940124	0759	1.96	0.083	12.0	64	80	0.54	0.42	4.23	41	0.15
940124	1108	1.89	0.083	12.0	90	85	0.50	0.30	5.47	31	-0.14
940124	1423	2.25	0.083	12.0	74	79	0.50	0.64	4.89	33	0.21
940124	1710	2.43	0.093	10.7	78	78	0.51	0.46	4.44	37	0.00
940124	2006	2.56	0.074	13.6	56	73	0.51	0.77	4.39	37	0.60

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940125	0209	3.24	0.083	12.0	54	70	0.49	0.85	5.52	32	0.16
940125	0510	4.18	0.064	15.6	64	66	0.44	0.81	6.73	24	0.06
940125	1110	4.06	0.064	15.6	58	64	0.43	0.98	8.02	23	0.23
940125	1410	3.79	0.064	15.6	62	66	0.43	1.08	7.51	23	0.28
940125	1710	3.41	0.064	15.6	60	66	0.45	1.21	7.48	21	0.39
940125	2010	3.30	0.074	13.6	60	67	0.46	1.17	7.10	23	0.57
940126	0207	3.82	0.074	13.6	62	64	0.40	1.04	8.41	20	0.13
940126	0510	3.64	0.074	13.6	54	63	0.42	1.23	8.15	21	0.33
940126	0810	3.00	0.083	12.0	56	64	0.46	1.04	7.24	25	0.41
940126	1109	3.08	0.074	13.6	54	63	0.42	0.98	7.84	24	0.36
940126	1413	2.81	0.074	13.6	52	63	0.44	0.93	6.80	28	0.32
940126	1711	2.55	0.074	13.6	54	64	0.45	1.08	6.74	26	0.55
940126	2009	2.54	0.083	12.0	54	63	0.45	1.21	6.65	24	0.64
940127	0210	2.51	0.083	12.0	52	63	0.47	0.77	5.48	31	0.49
940127	0510	2.26	0.083	12.0	50	63	0.49	0.71	5.11	34	0.36
940127	0808	2.10	0.093	10.7	52	63	0.48	0.74	5.99	30	0.28
940127	1122	2.01	0.083	12.0	54	67	0.49	0.57	6.09	30	0.16
940127	1413	2.22	0.113	8.9	68	65	0.44	0.60	7.46	24	-0.12
940127	1714	2.56	0.054	18.5	68	65	0.40	0.41	8.46	21	-0.38
940127	2009	2.68	0.054	18.5	66	63	0.44	0.50	7.40	23	-0.12
940128	0207	3.16	0.064	15.6	62	63	0.40	0.72	9.55	18	-0.02
940128	0509	2.81	0.064	15.6	64	62	0.39	0.55	9.42	19	-0.23
940128	0805	2.78	0.064	15.6	64	62	0.39	0.83	9.76	18	-0.20
940128	1101	2.77	0.064	15.6	62	60	0.41	0.84	8.69	20	-0.14
940128	1425	2.99	0.064	15.6	52	58	0.39	0.89	8.97	21	0.03
940128	1718	2.81	0.064	15.6	52	58	0.42	0.92	8.33	23	0.06
940128	2007	2.66	0.074	13.6	58	59	0.41	0.90	8.55	22	0.00
940129	0210	2.02	0.074	13.6	52	58	0.47	1.70	8.51	18	0.28
940129	0509	1.71	0.083	12.0	52	60	0.51	1.88	7.71	22	0.50
940129	0809	1.58	0.093	10.7	50	60	0.55	1.82	6.59	26	0.74
940129	1109	1.51	0.074	13.6	52	61	0.51	1.77	7.32	22	0.57
940129	1409	1.45	0.074	13.6	52	61	0.51	1.66	6.88	25	0.62
940129	1709	1.45	0.074	13.6	50	58	0.54	1.95	6.56	25	0.51
940129	2009	1.42	0.083	12.0	50	59	0.53	2.11	7.26	22	0.29
940130	0209	1.19	0.083	12.0	56	65	0.60	2.01	5.68	26	0.49
940130	0509	1.11	0.074	13.6	54	63	0.59	1.91	5.54	28	0.59
940130	0809	1.17	0.054	18.5	52	61	0.59	1.87	5.81	28	0.10
940130	1109	1.10	0.074	13.6	52	61	0.61	1.95	5.42	29	0.39
940130	1407	0.96	0.054	18.5	48	70	0.73	1.52	3.64	45	0.64
940130	1709	1.01	0.054	18.5	48	71	0.68	1.42	3.85	39	0.11
940130	2009	1.05	0.054	18.5	72	73	0.68	1.56	4.12	33	0.00
940131	0207	1.00	0.054	18.5	58	76	0.68	1.38	4.07	38	0.17
940131	0504	1.19	0.054	18.5	76	76	0.64	1.34	4.06	37	0.14
940131	1115	1.55	0.064	15.6	72	77	0.56	1.37	5.73	25	0.33
940131	1422	1.74	0.064	15.6	80	89	0.84	2.98	4.18	37	0.61
940131	1713	1.86	0.064	15.6	80	86	0.72	1.84	5.14	31	0.45
940131	2009	1.91	0.064	15.6	82	83	0.59	0.78	5.85	28	0.04
940131	2309	1.98	0.064	15.6	80	86	0.51	0.80	5.90	27	0.46
940201	0209	1.89	0.064	15.6	82	88	0.53	0.92	5.87	29	0.40
940201	0509	1.83	0.074	13.6	82	90	0.61	1.13	4.95	37	0.33
940201	0807	1.94	0.064	15.6	78	87	0.70	1.74	4.80	38	0.62
940201	1122	1.83	0.074	13.6	72	94	0.91	2.26	3.29	60	0.72
940201	1430	1.87	0.074	13.6	76	93	0.90	2.16	3.39	58	0.91

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940201	1722	1.80	0.074	13.6	78	91	0.76	1.76	4.07	42	0.89
940201	2009	1.76	0.054	18.5	72	87	0.71	1.61	4.07	40	1.09
940202	0209	1.87	0.054	18.5	72	86	0.62	1.27	4.44	35	0.88
940202	0509	1.98	0.054	18.5	74	86	0.68	1.45	4.03	35	0.98
940202	0809	2.11	0.054	18.5	76	90	0.65	1.51	3.85	34	0.89
940202	1121	1.95	0.064	15.6	78	91	0.66	1.38	3.76	40	0.78
940202	1406	2.00	0.064	15.6	78	93	0.62	1.17	4.10	38	0.59
940202	1709	2.04	0.064	15.6	80	90	0.61	1.01	3.93	40	0.30
940202	2009	2.33	0.064	15.6	72	85	0.55	1.72	5.41	25	0.66
940203	0210	2.40	0.064	15.6	72	84	0.57	1.60	5.15	29	0.57
940203	0809	2.00	0.064	15.6	74	89	0.64	1.28	3.91	40	0.65
940203	1110	1.90	0.064	15.6	74	90	0.64	1.60	4.00	37	0.99
940203	1409	1.91	0.074	13.6	74	93	0.62	1.16	3.92	40	0.47
940203	1711	1.78	0.074	13.6	64	95	0.73	0.91	2.82	59	0.52
940203	2009	1.72	0.074	13.6	60	97	0.95	1.48	2.59	90	1.08
940204	0209	2.64	0.152	6.6	-170	-171	1.13	-1.25	1.87	147	-0.83
940204	0509	2.52	0.152	6.6	-112	171	1.19	-0.43	1.45	157	-0.47
940204	0809	2.28	0.054	18.5	70	115	1.12	1.20	1.84	123	1.04
940204	1112	2.07	0.054	18.5	70	112	0.97	0.91	2.15	100	0.89
940204	1409	2.11	0.054	18.5	74	123	0.83	-0.08	1.78	89	-0.48
940204	1718	1.92	0.064	15.6	168	121	0.84	-0.05	1.78	90	-0.10
940204	2009	1.82	0.064	15.6	82	115	0.84	0.06	1.92	87	0.21
940205	0209	1.66	0.064	15.6	64	90	0.76	1.19	2.82	62	1.22
940205	0509	1.71	0.064	15.6	72	91	0.69	1.23	3.38	46	0.97
940205	0806	1.58	0.064	15.6	74	91	0.71	1.43	3.42	45	0.97
940205	1109	1.58	0.074	13.6	70	92	0.77	1.16	2.78	61	0.82
940205	1409	1.50	0.074	13.6	88	103	0.79	0.63	2.41	71	0.46
940205	1709	1.39	0.074	13.6	62	96	0.78	0.86	2.51	70	0.74
940205	2009	1.50	0.064	15.6	74	95	0.73	0.89	2.77	60	1.04
940206	0209	1.52	0.064	15.6	64	90	0.76	1.08	2.75	63	1.25
940206	0507	1.47	0.064	15.6	60	91	0.75	1.01	2.72	66	0.90
940206	0809	1.40	0.074	13.6	60	92	0.75	0.92	2.68	68	0.81
940206	1109	1.35	0.074	13.6	80	101	0.80	0.69	2.43	71	0.62
940206	1410	1.24	0.074	13.6	56	101	0.82	0.58	2.24	78	0.24
940206	1709	1.45	0.074	13.6	60	101	0.73	0.49	2.73	64	0.06
940206	2013	1.75	0.074	13.6	62	102	0.82	0.80	2.58	74	0.42
940207	0509	2.99	0.123	8.2	148	155	0.92	0.47	2.20	74	0.14
940207	0809	2.75	0.123	8.2	176	142	0.92	0.16	2.27	78	-0.18
940207	1110	2.21	0.123	8.2	174	140	0.81	-0.28	2.39	73	-0.29
940207	1400	2.14	0.123	8.2	168	133	0.77	-0.41	2.52	70	-0.43
940207	1710	2.18	0.123	8.2	168	125	0.76	-0.20	2.32	73	-0.24
940207	2009	2.47	0.123	8.2	166	119	0.70	-0.15	2.34	68	-0.14
940208	0209	2.51	0.113	8.9	168	125	0.70	-0.28	2.41	67	-0.25
940208	0809	2.83	0.103	9.7	138	109	0.66	-0.22	2.69	58	-0.17
940208	1106	3.18	0.113	8.9	58	92	0.70	0.10	2.35	66	0.10
940208	1408	3.65	0.093	10.7	46	82	0.71	0.34	2.10	72	0.41
940208	1708	3.85	0.093	10.7	52	78	0.63	0.48	2.45	59	0.57
940208	2008	3.55	0.093	10.7	50	77	0.59	0.29	2.74	54	0.17
940209	0208	3.57	0.093	10.7	50	62	0.49	1.04	4.88	32	0.56
940209	0509	3.11	0.083	12.0	50	61	0.48	1.28	5.46	28	0.77
940209	0808	2.79	0.093	10.7	50	62	0.50	1.15	5.19	32	0.74
940209	1109	2.61	0.093	10.7	44	60	0.53	1.15	4.90	36	0.75

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940209	1409	2.64	0.093	10.7	42	59	0.52	1.17	5.00	33	0.40
940209	1715	2.47	0.103	9.7	46	58	0.53	1.36	5.11	32	0.65
940210	0208	1.98	0.064	15.6	50	61	0.56	1.11	4.94	37	0.42
940210	0509	1.72	0.074	13.6	50	63	0.58	1.10	4.63	37	0.40
940210	0808	1.68	0.074	13.6	54	66	0.59	1.06	4.31	39	0.65
940210	1108	1.69	0.074	13.6	52	63	0.58	1.39	4.90	34	0.74
940210	1403	1.66	0.074	13.6	52	65	0.57	1.04	4.66	40	0.63
940211	0209	1.77	0.162	6.2	48	57	0.56	0.85	4.37	41	0.56
940211	0509	2.47	0.132	7.6	50	51	0.50	0.85	4.72	37	0.09
940211	0809	2.66	0.123	8.2	48	55	0.42	1.27	7.03	24	0.40
940211	1107	2.80	0.113	8.9	48	55	0.41	1.27	7.96	22	0.37
940211	1409	3.04	0.074	13.6	48	53	0.40	1.27	8.35	22	0.36
940212	1357	1.86	0.083	12.0	48	56	0.63	1.70	6.78	21	0.48
940213	0209	1.55	0.083	12.0	50	61	0.55	2.21	6.70	27	0.61
940213	0509	1.77	0.083	12.0	50	58	0.53	1.71	6.94	27	0.53
940213	1407	1.81	0.054	18.5	66	63	0.55	1.56	6.57	27	-0.16
940213	1709	1.96	0.054	18.5	68	65	0.49	1.55	7.58	21	-0.57
940213	2009	2.10	0.054	18.5	70	68	0.45	2.20	9.76	11	-0.33
940214	0209	1.83	0.054	18.5	54	65	0.55	1.76	6.31	27	0.14
940214	0509	2.29	0.074	13.6	46	62	0.51	1.39	6.18	32	0.66
940214	0809	2.54	0.074	13.6	50	59	0.46	1.41	7.73	24	0.60
940214	2004	2.90	0.074	13.6	60	61	0.38	1.57	12.20	13	-0.02
940215	0809	2.71	0.064	15.6	58	60	0.42	1.60	9.80	17	0.06
940215	1108	2.58	0.074	13.6	56	61	0.45	1.38	8.69	19	0.37
940215	1409	2.66	0.074	13.6	58	61	0.44	1.52	8.86	19	0.14
940215	2007	2.72	0.074	13.6	52	58	0.46	1.63	8.00	19	0.41
940216	0208	2.03	0.074	13.6	52	61	0.51	1.70	7.36	23	0.72
940216	1406	1.71	0.074	13.6	56	66	0.53	1.54	6.38	27	0.50
940216	1709	1.54	0.083	12.0	52	65	0.58	1.55	5.23	34	0.68
940217	0209	1.03	0.083	12.0	56	94	1.16	1.98	2.17	135	1.10
940217	0509	1.27	0.162	6.2	-100	173	1.25	-0.17	1.39	163	-0.01
940218	0509	4.06	0.093	10.7	78	86	0.51	0.23	3.92	38	0.23
940218	0809	3.86	0.083	12.0	84	83	0.51	0.36	4.31	37	-0.08
940218	1107	3.63	0.083	12.0	78	82	0.53	0.39	4.08	41	0.14
940218	1405	3.29	0.083	12.0	80	82	0.55	0.48	4.07	42	0.10
940218	1657	3.01	0.083	12.0	58	78	0.59	0.77	3.79	46	0.50
940218	2306	3.13	0.083	12.0	54	72	0.54	0.70	4.20	40	0.36
940219	0208	3.20	0.083	12.0	54	72	0.52	0.88	4.83	38	0.44
940219	0505	2.96	0.083	12.0	58	74	0.53	0.82	4.64	38	0.48
940219	0810	2.89	0.083	12.0	54	70	0.53	1.16	5.00	36	0.68
940219	1110	2.66	0.083	12.0	56	70	0.53	1.09	4.95	36	0.65
940219	1406	2.32	0.083	12.0	54	72	0.60	1.10	4.13	43	0.76
940219	1710	2.09	0.083	12.0	54	73	0.63	1.35	4.17	44	0.93
940219	2010	2.15	0.093	10.7	52	75	0.61	1.14	4.04	45	0.50
940219	2310	2.60	0.093	10.7	56	88	0.68	0.70	2.75	59	0.36
940220	0210	2.48	0.142	7.0	58	92	0.72	0.58	2.55	64	0.37
940220	0510	2.33	0.132	7.6	52	88	0.71	0.46	2.47	65	0.18
940220	0810	2.08	0.093	10.7	52	83	0.72	0.61	2.72	62	0.38
940220	1110	2.05	0.093	10.7	54	76	0.70	0.97	3.01	55	0.59

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940220	1410	2.24	0.093	10.7	54	76	0.64	0.87	3.32	48	0.17
940220	1715	2.27	0.103	9.7	56	73	0.60	0.86	3.73	44	0.38
940220	2010	2.53	0.093	10.7	58	68	0.57	0.88	4.16	40	0.34
940221	0210	2.47	0.093	10.7	56	68	0.59	0.81	4.00	43	0.40
940221	0507	2.39	0.083	12.0	58	67	0.54	1.04	4.70	34	0.54
940221	0810	2.08	0.093	10.7	50	67	0.60	1.33	4.60	40	0.68
940221	1110	2.21	0.093	10.7	50	64	0.54	1.46	5.35	34	0.70
940221	1410	2.16	0.093	10.7	52	62	0.53	1.34	5.30	33	0.50
940221	1710	2.08	0.093	10.7	54	64	0.57	1.09	4.42	40	0.47
940221	2010	1.88	0.093	10.7	50	64	0.60	1.13	4.31	44	0.39
940222	0202	1.73	0.093	10.7	56	64	0.56	0.90	4.46	37	0.18
940222	0510	1.62	0.093	10.7	50	63	0.56	1.06	4.73	37	0.42
940222	0759	1.82	0.093	10.7	48	59	0.50	1.20	5.66	31	0.65
940222	1112	2.41	0.093	10.7	44	55	0.45	1.33	5.91	28	0.82
940222	1409	2.66	0.083	12.0	42	51	0.45	1.36	5.91	25	0.63
940222	1714	2.85	0.074	13.6	44	50	0.44	1.49	7.32	20	0.41
940222	2009	2.65	0.074	13.6	46	54	0.47	1.13	6.03	28	0.55
940223	0209	2.19	0.074	13.6	44	53	0.45	1.29	7.07	26	0.48
940223	0509	2.21	0.083	12.0	50	53	0.45	1.17	7.15	23	0.15
940223	0809	2.07	0.083	12.0	46	54	0.45	1.48	7.51	23	0.65
940223	1112	2.04	0.083	12.0	42	54	0.47	1.29	6.55	29	0.68
940223	1409	1.96	0.083	12.0	40	53	0.49	1.24	6.44	31	0.28
940223	1713	1.80	0.083	12.0	50	54	0.50	1.22	6.16	30	0.16
940223	2009	1.61	0.083	12.0	48	57	0.53	1.63	6.35	27	0.63
940224	0209	1.42	0.093	10.7	54	61	0.51	1.60	6.77	27	0.28
940224	0508	1.34	0.074	13.6	50	62	0.55	1.70	5.75	30	0.39
940224	1410	1.45	0.064	15.6	58	60	0.56	1.70	5.54	30	0.12
940224	1707	1.34	0.064	15.6	64	64	0.61	1.59	4.52	36	0.30
940224	2002	1.28	0.064	15.6	54	77	0.84	0.82	2.72	65	0.48
940225	0247	1.30	0.074	13.6	54	71	0.68	1.43	3.65	43	0.76
940225	0809	1.26	0.074	13.6	54	69	0.71	1.50	3.33	45	0.81
940225	1128	1.04	0.074	13.6	50	80	0.83	1.21	2.51	78	1.32
940226	0208	0.98	0.074	13.6	44	91	0.87	0.47	1.90	95	0.50
940226	0510	0.98	0.074	13.6	148	94	0.84	0.38	1.97	88	0.52
940226	1410	1.08	0.074	13.6	64	101	0.84	0.57	2.03	86	0.88
940226	1708	1.26	0.074	13.6	60	88	0.78	1.07	2.52	71	1.02
940226	2010	1.44	0.074	13.6	80	85	0.67	0.97	3.26	42	0.31
940227	0850	1.51	0.074	13.6	64	80	0.67	0.96	3.54	44	0.38
940227	1109	1.55	0.074	13.6	58	82	0.69	0.84	3.10	53	0.37
940227	1409	1.70	0.074	13.6	70	79	0.61	0.78	3.72	40	0.17
940227	1709	1.79	0.074	13.6	60	71	0.60	0.94	4.18	37	0.29
940227	2009	1.71	0.083	12.0	54	74	0.64	0.84	3.53	46	0.09
940228	0207	1.92	0.083	12.0	60	70	0.57	0.52	3.91	43	0.02
940228	0509	1.92	0.083	12.0	56	69	0.58	0.65	3.83	45	0.32
940228	0809	1.93	0.083	12.0	54	65	0.57	1.04	4.33	39	0.42
940228	1413	1.95	0.083	12.0	54	67	0.58	0.89	3.85	41	0.45
940228	1715	1.95	0.083	12.0	56	69	0.58	0.56	3.82	45	0.28
940228	2009	1.91	0.083	12.0	68	66	0.58	0.44	3.86	43	-0.08
940301	0211	1.85	0.083	12.0	60	69	0.57	0.46	4.22	39	0.12
940301	0511	1.83	0.093	10.7	60	68	0.54	0.56	4.63	38	0.17
940301	0811	2.01	0.093	10.7	52	62	0.57	0.77	4.29	42	0.28

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940301	1121	1.90	0.093	10.7	62	62	0.58	0.57	4.14	40	-0.05
940301	1409	2.01	0.064	15.6	64	67	0.58	0.62	4.16	37	0.36
940301	1708	1.97	0.064	15.6	70	67	0.57	0.52	4.34	35	-0.25
940301	2006	2.07	0.064	15.6	68	66	0.55	0.78	4.79	36	0.09
940302	0209	2.28	0.074	13.6	62	65	0.50	0.92	6.44	25	0.08
940302	0509	2.26	0.074	13.6	60	65	0.53	0.75	5.42	33	0.17
940302	1109	2.15	0.083	12.0	64	65	0.53	0.62	5.00	34	-0.03
940302	1406	2.10	0.083	12.0	64	67	0.50	0.79	6.11	29	0.09
940302	1709	2.04	0.083	12.0	64	70	0.51	0.77	5.70	30	0.13
940302	2009	2.07	0.083	12.0	58	67	0.56	0.53	4.53	41	0.03
940303	0509	1.84	0.083	12.0	62	74	0.54	0.96	5.32	37	0.27
940303	0804	2.00	0.083	12.0	56	70	0.53	0.76	4.82	39	0.45
940303	1107	1.98	0.083	12.0	56	71	0.55	0.94	4.91	37	0.20
940303	1408	2.00	0.083	12.0	84	74	0.51	0.82	5.56	33	-0.04
940303	1708	1.83	0.083	12.0	62	77	0.57	0.81	4.56	41	0.57
940303	2006	1.79	0.083	12.0	54	72	0.58	0.78	4.36	42	0.21
940304	0209	2.51	0.074	13.6	60	69	0.48	1.00	6.42	27	0.40
940304	0508	2.53	0.074	13.6	56	69	0.50	1.12	6.01	31	0.58
940304	0808	2.34	0.083	12.0	70	71	0.54	0.79	5.11	33	0.10
940304	1120	2.20	0.083	12.0	62	68	0.55	0.93	5.28	34	0.24
940304	1408	2.09	0.083	12.0	60	71	0.58	0.90	4.44	40	0.29
940304	1715	1.98	0.083	12.0	54	75	0.60	0.94	4.26	44	0.32
940304	2011	1.95	0.083	12.0	60	72	0.61	0.71	3.75	45	0.15
940305	0810	1.72	0.093	10.7	58	78	0.70	1.07	3.29	53	0.45
940305	1110	1.73	0.083	12.0	58	79	0.69	0.94	3.32	53	0.34
940305	1410	1.86	0.083	12.0	50	78	0.66	0.82	3.17	53	0.17
940305	1710	2.08	0.083	12.0	58	77	0.64	0.91	3.51	47	0.30
940305	2008	1.93	0.083	12.0	60	73	0.63	1.14	3.87	42	0.51
940306	0210	2.08	0.083	12.0	56	67	0.57	1.43	4.79	33	0.70
940306	0510	2.02	0.083	12.0	48	67	0.60	1.25	4.09	44	0.91
940306	0810	2.26	0.083	12.0	48	62	0.59	1.63	4.85	36	0.88
940306	1110	2.58	0.083	12.0	46	63	0.60	1.72	4.81	38	0.71
940306	1410	2.99	0.083	12.0	52	58	0.48	1.10	5.68	29	0.21
940306	1710	2.90	0.083	12.0	46	56	0.58	1.68	5.23	34	0.67
940306	2008	2.27	0.083	12.0	44	62	0.62	1.76	4.89	37	0.61
940307	0210	2.66	0.083	12.0	44	55	0.55	1.56	5.56	33	0.43
940307	0510	2.68	0.083	12.0	44	52	0.51	1.89	6.78	25	0.62
940307	1125	2.24	0.083	12.0	44	55	0.52	1.61	6.05	30	0.61
940308	0208	1.74	0.093	10.7	44	56	0.54	1.61	5.89	33	0.81
940308	0511	1.68	0.093	10.7	40	55	0.53	1.67	5.76	33	0.74
940308	0811	1.37	0.093	10.7	40	56	0.61	1.82	4.99	36	0.94
940308	1109	1.39	0.093	10.7	38	57	0.57	1.53	5.22	38	0.68
940308	1410	1.49	0.103	9.7	40	52	0.56	1.68	5.39	32	0.64
940308	1716	1.23	0.103	9.7	38	57	0.61	1.67	4.89	40	0.92
940308	2010	1.02	0.103	9.7	34	56	0.67	1.88	4.25	43	0.88
940309	0210	0.94	0.113	8.9	44	62	0.63	1.87	4.63	36	0.33
940309	0510	0.89	0.123	8.2	44	65	0.68	1.72	4.11	40	0.32
940309	0810	0.87	0.113	8.9	42	62	0.68	2.13	4.46	37	0.49
940309	1104	0.80	0.064	15.6	38	68	0.76	1.66	3.42	49	0.29
940309	1410	0.94	0.064	15.6	76	74	0.71	1.65	3.78	38	-0.15
940309	1705	0.94	0.064	15.6	72	74	0.71	1.56	3.68	37	0.15
940309	2008	1.15	0.074	13.6	54	73	0.67	1.53	4.18	41	0.40

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940310	0210	1.11	0.074	13.6	60	75	0.68	1.84	4.24	35	0.52
940310	0510	1.01	0.074	13.6	54	79	0.74	1.47	3.40	46	0.21
940310	1109	1.03	0.074	13.6	56	86	0.80	1.34	2.82	57	0.52
940310	1409	1.25	0.083	12.0	82	80	0.71	1.36	3.52	43	-0.14
940310	1707	1.20	0.083	12.0	56	76	0.71	1.81	3.80	41	0.50
940310	2010	1.15	0.083	12.0	48	75	0.79	1.70	3.13	54	0.96
940311	0508	2.02	0.142	7.0	50	57	0.61	1.48	4.82	41	0.45
940311	0810	2.69	0.132	7.6	48	52	0.55	1.51	5.71	34	0.22
940311	1059	2.52	0.074	13.6	52	59	0.51	1.86	6.79	25	0.38
940311	1350	2.73	0.123	8.2	48	59	0.51	1.37	5.87	32	0.40
940311	1700	2.81	0.123	8.2	54	58	0.54	1.28	5.62	35	0.12
940312	0203	2.99	0.083	12.0	50	62	0.54	1.56	5.81	32	0.51
940312	0509	2.73	0.074	13.6	54	62	0.57	1.57	5.58	34	0.42
940312	0809	2.53	0.074	13.6	52	65	0.66	1.90	4.64	37	0.78
940313	0209	1.98	0.083	12.0	56	77	0.71	1.40	3.46	47	0.52
940313	0509	1.73	0.074	13.6	52	86	0.82	0.90	2.56	67	0.34
940313	1108	1.55	0.064	15.6	56	88	0.82	0.85	2.41	71	0.53
940313	1408	1.54	0.064	15.6	54	89	0.77	0.76	2.74	61	0.18
940313	1704	1.55	0.064	15.6	60	98	0.88	0.49	2.08	88	0.48
940313	2008	1.65	0.064	15.6	78	97	0.85	0.83	2.19	83	1.04
940314	0209	1.86	0.074	13.6	62	87	0.75	1.10	2.82	60	0.94
940314	0509	2.03	0.074	13.6	62	87	0.78	1.22	2.81	58	0.72
940314	0808	1.98	0.074	13.6	56	84	0.83	1.24	2.53	73	1.17
940314	1108	2.05	0.074	13.6	56	82	0.79	1.43	2.82	58	0.94
940314	1408	2.11	0.074	13.6	56	93	0.84	0.97	2.34	77	0.55
940314	1708	1.96	0.083	12.0	58	84	0.81	1.46	2.79	57	0.64
940314	2008	1.95	0.083	12.0	70	92	0.82	0.91	2.45	67	0.66
940315	0209	1.85	0.083	12.0	58	89	0.75	1.00	2.80	58	0.20
940315	0500	1.80	0.083	12.0	56	86	0.77	1.07	2.78	56	0.10
940315	0808	1.55	0.083	12.0	52	92	0.87	0.94	2.22	90	0.61
940315	1108	1.71	0.083	12.0	66	94	0.79	0.69	2.49	67	0.40
940315	1408	1.64	0.093	10.7	68	92	0.78	0.91	2.64	59	0.35
940315	1713	1.54	0.074	13.6	96	92	0.80	0.65	2.44	69	-0.06
940315	2005	1.52	0.074	13.6	94	96	0.80	0.68	2.39	72	0.30
940316	0205	1.68	0.083	12.0	104	97	0.72	0.83	2.92	51	-0.11
940316	0509	1.69	0.083	12.0	62	92	0.72	0.77	2.89	54	0.02
940316	0808	2.01	0.054	18.5	62	86	0.69	1.06	3.29	47	0.44
940316	1108	2.14	0.054	18.5	62	83	0.71	1.16	3.10	53	0.87
940316	1409	2.40	0.064	15.6	58	76	0.65	1.52	3.98	44	1.43
940316	1708	2.65	0.064	15.6	64	74	0.58	1.57	5.04	29	0.86
940316	2008	2.42	0.064	15.6	60	78	0.66	1.29	3.94	42	0.73
940317	0209	2.37	0.074	13.6	58	73	0.65	1.33	3.84	45	1.11
940317	0508	2.78	0.064	15.6	60	67	0.56	1.50	5.08	28	0.46
940317	0805	2.69	0.074	13.6	50	63	0.58	1.78	5.22	31	0.52
940317	1108	2.72	0.074	13.6	54	63	0.57	1.83	5.67	29	0.33
940317	1421	2.87	0.074	13.6	50	62	0.53	2.03	6.75	27	0.58
940317	2152	2.60	0.074	13.6	54	63	0.60	1.99	5.56	31	0.27
940318	0208	2.23	0.074	13.6	52	60	0.58	2.91	6.57	22	0.64
940318	0509	2.17	0.074	13.6	50	68	0.67	2.09	4.56	39	0.64
940318	0808	2.08	0.074	13.6	50	66	0.70	1.79	4.12	42	0.72
940318	1100	1.91	0.083	12.0	48	62	0.71	2.45	4.45	37	0.85
940318	2009	1.97	0.083	12.0	54	67	0.66	2.25	4.65	33	0.59

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940319	0209	2.09	0.083	12.0	52	62	0.58	2.54	6.15	26	0.55
940319	0809	1.95	0.083	12.0	58	66	0.62	2.85	5.78	24	0.62
940319	1108	1.80	0.083	12.0	50	67	0.74	2.53	4.26	38	0.94
940319	1408	2.15	0.083	12.0	50	61	0.59	2.93	6.26	23	0.77
940319	1708	2.47	0.083	12.0	50	61	0.52	2.12	6.70	25	0.63
940319	2008	2.77	0.074	13.6	48	57	0.51	2.32	7.47	23	0.43
940319	2304	2.90	0.074	13.6	50	57	0.48	2.08	7.83	23	0.45
940320	0208	3.19	0.074	13.6	52	58	0.43	2.39	9.64	18	0.43
940320	0509	3.52	0.074	13.6	48	58	0.47	2.07	7.95	23	0.71
940320	0808	3.56	0.074	13.6	50	58	0.48	2.12	7.88	23	0.69
940320	1108	3.22	0.074	13.6	48	56	0.46	2.40	9.07	21	0.48
940320	1408	3.20	0.074	13.6	52	58	0.42	2.33	10.47	16	0.39
940320	1708	2.90	0.074	13.6	48	56	0.48	2.62	8.89	19	0.67
940320	2008	2.55	0.074	13.6	50	59	0.53	2.44	7.29	24	0.59
940321	0208	2.56	0.074	13.6	50	58	0.45	2.99	10.07	16	0.52
940321	0509	2.40	0.074	13.6	52	61	0.53	2.61	7.29	22	0.51
940321	0808	2.47	0.074	13.6	52	60	0.48	2.08	8.02	24	0.41
940321	1108	2.13	0.083	12.0	50	59	0.52	2.88	7.82	23	0.47
940321	1408	1.99	0.083	12.0	50	58	0.55	3.30	7.40	20	0.69
940321	1709	1.75	0.083	12.0	52	65	0.65	2.51	5.20	31	0.64
940321	2008	1.97	0.083	12.0	52	62	0.61	1.96	5.58	30	0.28
940322	0158	2.94	0.083	12.0	46	53	0.52	2.27	7.19	24	0.49
940322	0509	3.43	0.074	13.6	48	54	0.45	1.69	8.45	22	0.34
940322	0807	3.98	0.074	13.6	52	53	0.48	1.08	7.11	26	0.03
940322	1408	3.40	0.074	13.6	50	55	0.45	1.56	8.40	21	0.31
940322	1709	3.58	0.074	13.6	52	58	0.47	1.78	8.04	21	0.35
940323	0213	3.83	0.064	15.6	56	57	0.41	1.16	9.44	19	0.07
940323	0513	3.58	0.064	15.6	56	57	0.41	1.80	10.57	14	-0.03
940323	0811	3.55	0.064	15.6	56	59	0.44	1.84	9.12	17	0.33
940323	1112	3.41	0.074	13.6	52	58	0.44	1.50	8.38	21	0.36
940323	1413	3.53	0.074	13.6	52	57	0.48	1.72	7.85	23	0.30
940323	1702	3.23	0.074	13.6	50	55	0.47	1.85	8.13	21	0.36
940323	2013	2.78	0.074	13.6	54	58	0.51	1.55	6.60	27	0.19
940324	0213	2.22	0.074	13.6	52	64	0.57	1.72	5.54	32	0.35
940324	0511	1.78	0.074	13.6	48	70	0.69	1.55	3.89	43	0.43
940324	0813	1.50	0.083	12.0	50	77	0.82	1.51	3.06	57	0.68
940324	1201	2.09	0.162	6.2	-106	-176	1.18	-1.25	1.85	151	-0.87
940324	1409	2.78	0.152	6.6	-180	171	1.12	-0.59	1.73	138	-0.49
940324	1714	3.14	0.132	7.6	74	131	0.97	0.28	1.96	97	-0.11
940324	2013	2.94	0.123	8.2	60	110	0.86	0.36	1.98	92	0.05
940325	0213	2.85	0.083	12.0	54	82	0.74	1.07	2.75	66	1.15
940325	0513	3.36	0.074	13.6	56	77	0.71	1.29	3.17	54	1.11
940325	0813	3.10	0.074	13.6	56	80	0.72	1.24	3.02	58	0.95
940325	1113	2.72	0.083	12.0	58	81	0.73	1.18	3.04	58	0.96
940325	1411	2.52	0.083	12.0	60	84	0.72	0.82	2.91	58	0.48
940325	1712	2.24	0.083	12.0	60	91	0.72	0.62	2.65	63	0.62
940325	2003	2.17	0.064	15.6	60	87	0.73	0.88	2.75	63	1.06
940326	0202	2.11	0.064	15.6	58	81	0.72	1.21	2.96	61	1.37
940326	0503	2.14	0.074	13.6	56	79	0.71	1.01	2.88	61	1.05
940326	0803	2.17	0.074	13.6	54	75	0.68	1.18	3.32	52	0.90
940326	1103	2.15	0.074	13.6	56	74	0.65	1.28	3.82	42	0.63
940326	1403	2.21	0.074	13.6	54	70	0.66	1.46	4.05	37	0.25
940326	1702	2.04	0.044	22.5	76	78	0.74	1.35	3.25	43	0.22

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Appendix A Table of Collection Times and Bulk Parameters

Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940327	0203	2.19	0.054	18.5	68	72	0.63	1.98	4.79	21	0.27
940327	1924	1.91	0.064	15.6	68	83	0.87	1.39	2.50	81	1.48
940328	0200	2.40	0.064	15.6	66	76	0.67	2.09	4.29	26	0.74
940328	0759	2.14	0.064	15.6	64	77	0.71	2.16	3.94	30	0.87
940328	1103	1.82	0.064	15.6	64	84	0.84	1.75	2.90	63	1.70
940328	1411	1.89	0.064	15.6	68	81	0.75	1.61	3.28	40	1.08
940328	1713	1.73	0.064	15.6	66	79	0.77	1.85	3.23	46	0.93
940328	2009	1.72	0.074	13.6	70	87	0.80	1.17	2.61	71	1.41
940329	0213	1.62	0.074	13.6	60	85	0.78	1.12	2.60	68	1.06
940329	0513	1.33	0.074	13.6	46	90	0.86	0.82	2.28	85	0.50
940329	0813	1.31	0.074	13.6	64	92	0.83	1.05	2.35	80	1.11
940329	1113	1.30	0.074	13.6	82	100	0.77	0.29	2.53	65	0.58
940329	1411	1.25	0.074	13.6	60	90	0.74	0.89	2.80	59	0.49
940329	1711	1.28	0.074	13.6	88	96	0.75	0.52	2.45	66	0.30
940329	2013	1.28	0.074	13.6	60	93	0.74	0.80	2.60	63	0.43
940330	0213	1.58	0.083	12.0	72	88	0.63	0.92	3.71	42	0.39
940330	0511	1.69	0.083	12.0	68	83	0.60	0.94	3.99	40	0.46
940330	0813	2.01	0.083	12.0	82	75	0.59	0.60	4.10	37	-0.31
940330	1116	2.15	0.093	10.7	56	73	0.59	0.74	3.79	43	0.48
940330	1415	2.28	0.103	9.7	54	71	0.61	0.71	3.42	49	0.63
940330	1714	2.49	0.142	7.0	52	67	0.59	0.68	3.78	46	0.26
940330	2013	2.93	0.132	7.6	58	59	0.53	0.69	4.37	40	0.07
940331	0211	2.73	0.132	7.6	56	58	0.55	1.01	4.56	39	0.10
940331	0513	2.68	0.123	8.2	50	63	0.56	1.10	4.55	40	0.39
940331	0813	2.47	0.113	8.9	56	62	0.55	1.37	5.38	33	0.35
940331	1113	2.35	0.064	15.6	56	63	0.57	1.52	5.16	31	0.40
940331	1413	2.42	0.074	13.6	52	59	0.58	1.46	5.21	29	0.55
940331	1713	2.50	0.074	13.6	56	65	0.58	1.14	4.73	33	0.54
940331	2013	2.84	0.074	13.6	54	65	0.55	1.21	5.09	35	0.29
940401	0211	2.65	0.074	13.6	56	66	0.54	1.60	5.82	28	0.50
940401	0511	2.64	0.074	13.6	54	62	0.55	1.40	5.42	32	0.49
940401	0813	2.36	0.074	13.6	54	66	0.55	1.25	5.07	36	0.58
940401	1114	2.38	0.083	12.0	56	68	0.57	1.47	5.13	35	0.64
940401	1415	2.48	0.054	18.5	78	72	0.56	1.20	5.12	32	-0.53
940401	2011	2.99	0.054	18.5	78	74	0.49	0.99	6.29	22	-0.55
940402	0513	3.24	0.064	15.6	74	74	0.48	0.91	6.44	24	-0.02
940402	0811	3.55	0.064	15.6	76	76	0.46	1.08	7.15	20	-0.07
940402	1113	3.45	0.064	15.6	76	75	0.47	1.21	7.20	20	-0.21
940402	1413	3.21	0.064	15.6	76	75	0.47	0.95	6.38	22	-0.19
940402	1711	3.31	0.064	15.6	70	75	0.48	0.88	5.98	24	0.36
940402	2013	3.15	0.064	15.6	74	72	0.47	0.98	6.48	25	-0.19
940403	0211	3.00	0.064	15.6	56	70	0.53	0.92	4.81	34	0.16
940403	0511	3.02	0.074	13.6	58	66	0.51	0.96	5.49	31	0.18
940403	0813	3.08	0.074	13.6	58	69	0.51	0.73	4.71	34	0.22
940403	1110	3.15	0.074	13.6	60	64	0.49	0.96	5.32	28	0.27
940403	1410	2.91	0.074	13.6	58	64	0.54	1.00	4.64	32	0.23
940403	1713	2.81	0.074	13.6	56	64	0.55	1.24	4.61	33	0.43
940403	2010	2.66	0.074	13.6	56	61	0.56	1.01	4.63	38	0.24
940404	0211	2.82	0.074	13.6	56	61	0.57	1.04	4.14	38	0.09
940404	0513	2.82	0.083	12.0	54	61	0.49	1.27	5.61	28	0.28
940404	0816	2.60	0.083	12.0	54	61	0.49	0.96	5.42	33	0.22
940404	1113	2.58	0.083	12.0	58	59	0.50	1.14	5.68	31	0.00

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940404	1413	2.44	0.093	10.7	54	56	0.55	1.11	4.75	37	0.13
940404	1708	2.14	0.083	12.0	58	59	0.54	1.10	5.05	33	-0.01
940404	2013	2.02	0.083	12.0	48	59	0.53	1.24	5.25	33	0.47
940405	0213	2.35	0.093	10.7	30	57	0.53	0.74	4.21	43	0.12
940405	0508	2.38	0.093	10.7	60	55	0.49	0.84	5.20	35	-0.08
940405	0813	2.27	0.093	10.7	46	54	0.49	1.14	5.66	33	0.41
940405	1146	2.23	0.093	10.7	46	55	0.49	1.09	5.78	33	0.42
940405	1413	2.17	0.103	9.7	32	53	0.51	1.16	5.54	36	0.33
940405	1713	2.16	0.103	9.7	54	54	0.53	1.01	5.17	36	0.04
940406	0213	2.07	0.054	18.5	80	61	0.57	0.66	4.23	45	-0.19
940406	0511	2.32	0.054	18.5	80	61	0.58	0.77	4.00	46	-0.24
940406	0805	2.14	0.064	15.6	76	66	0.55	0.54	4.37	40	-0.52
940406	1115	2.20	0.064	15.6	70	69	0.54	0.99	5.09	28	-0.41
940406	1416	2.24	0.064	15.6	72	70	0.58	0.82	4.08	35	-0.65
940406	1716	2.32	0.064	15.6	74	69	0.58	0.94	4.40	31	-0.81
940406	2013	2.40	0.064	15.6	72	69	0.58	1.26	4.78	25	-0.62
940407	0213	2.28	0.064	15.6	70	78	0.55	1.57	5.12	22	0.63
940407	0512	2.14	0.064	15.6	70	77	0.58	1.65	5.03	24	0.48
940407	0816	2.39	0.074	13.6	70	73	0.62	1.30	3.88	36	0.18
940407	1109	2.28	0.074	13.6	68	75	0.63	1.20	3.76	37	0.22
940407	1411	2.21	0.074	13.6	66	74	0.63	1.59	4.07	30	0.36
940407	1710	2.47	0.074	13.6	66	68	0.59	1.40	4.48	29	-0.02
940407	2012	2.49	0.074	13.6	62	70	0.68	1.09	3.30	42	0.11
940408	0213	2.52	0.074	13.6	58	74	0.63	1.33	3.69	38	0.34
940408	0513	2.46	0.074	13.6	60	70	0.62	1.45	4.14	35	0.37
940408	0813	2.46	0.074	13.6	56	71	0.63	1.54	4.12	35	0.60
940408	1109	2.18	0.074	13.6	56	73	0.67	1.26	3.54	41	0.43
940408	1426	2.10	0.074	13.6	54	74	0.66	1.37	3.53	42	0.52
940408	1729	1.98	0.083	12.0	64	79	0.67	1.05	3.09	50	0.88
940408	2013	1.73	0.083	12.0	56	86	0.75	0.84	2.52	68	0.79
940409	0213	1.59	0.083	12.0	62	79	0.67	1.17	3.37	48	0.77
940409	0513	1.50	0.083	12.0	66	83	0.72	0.99	2.86	56	0.88
940409	0813	1.50	0.083	12.0	60	85	0.76	0.99	2.74	61	0.81
940409	1110	1.65	0.093	10.7	60	78	0.67	1.36	3.53	44	0.80
940409	1413	1.91	0.093	10.7	60	73	0.64	1.23	3.63	42	0.47
940409	1713	2.00	0.093	10.7	52	68	0.61	1.19	3.94	42	0.29
940409	2013	2.58	0.142	7.0	60	62	0.55	1.02	4.52	39	0.04
940410	0213	2.95	0.103	9.7	52	60	0.50	1.15	5.16	33	0.23
940410	0513	2.63	0.093	10.7	52	62	0.52	0.95	5.01	37	-0.01
940410	0813	2.38	0.093	10.7	62	63	0.55	1.38	5.21	31	-0.04
940410	1113	2.31	0.093	10.7	58	64	0.53	1.76	5.89	27	0.36
940410	1413	2.37	0.093	10.7	62	61	0.56	1.21	4.93	35	-0.16
940410	1713	2.63	0.093	10.7	62	62	0.57	0.96	4.36	40	-0.03
940410	2013	2.55	0.093	10.7	60	60	0.52	1.36	5.77	32	-0.01
940411	0213	2.28	0.103	9.7	56	65	0.53	1.86	6.37	30	0.36
940411	0513	2.29	0.103	9.7	76	69	0.54	1.17	5.49	33	-0.10
940411	0813	2.04	0.103	9.7	54	72	0.62	1.49	4.51	37	0.10
940411	1103	1.95	0.103	9.7	54	71	0.61	1.60	4.84	38	0.40
940411	1403	1.89	0.103	9.7	54	68	0.67	1.44	3.93	48	0.66
940411	1703	1.78	0.074	13.6	62	69	0.68	1.16	4.20	40	0.21
940411	2003	1.66	0.074	13.6	66	70	0.72	1.19	3.68	37	0.23
940412	0203	1.44	0.074	13.6	62	79	0.77	1.52	3.15	53	1.23

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940412	0503	1.42	0.074	13.6	64	78	0.75	1.74	3.49	38	0.64
940412	0803	1.38	0.064	15.6	62	75	0.74	1.63	3.50	40	0.50
940412	1103	1.47	0.074	13.6	66	79	0.75	1.25	2.94	52	1.00
940412	1359	1.35	0.074	13.6	58	80	0.80	1.50	2.99	53	0.84
940412	1702	1.38	0.074	13.6	66	77	0.65	1.39	4.06	35	0.50
940412	2003	1.42	0.074	13.6	64	75	0.67	1.87	4.26	31	0.49
940413	0159	1.51	0.083	12.0	58	68	0.67	2.01	4.41	34	0.26
940413	0503	1.53	0.083	12.0	60	69	0.71	1.89	3.97	39	0.41
940413	0803	1.72	0.083	12.0	66	63	0.64	1.75	4.90	34	-0.10
940413	1102	1.76	0.083	12.0	58	61	0.61	1.74	5.23	32	0.10
940413	1358	1.93	0.132	7.6	56	58	0.56	2.02	6.34	26	0.06
940413	1703	2.10	0.132	7.6	56	54	0.55	1.24	6.01	34	-0.11
940413	2003	2.37	0.123	8.2	68	56	0.56	0.87	5.27	38	-0.23
940414	0203	2.25	0.083	12.0	52	56	0.55	1.70	6.18	28	0.10
940414	1103	2.57	0.093	10.7	52	57	0.52	1.62	6.72	30	0.11
940414	1406	2.36	0.083	12.0	48	57	0.56	2.30	6.50	28	0.41
940414	1659	2.14	0.083	12.0	52	55	0.61	2.23	5.87	31	0.21
940414	2006	2.14	0.093	10.7	52	54	0.63	1.89	5.31	38	0.07
940415	0156	2.02	0.093	10.7	48	58	0.60	2.65	5.95	27	0.31
940415	0506	1.90	0.103	9.7	44	63	0.66	2.03	4.59	38	0.52
940415	0806	1.74	0.093	10.7	64	70	0.71	1.91	4.00	36	0.19
940415	1106	1.83	0.093	10.7	58	68	0.71	2.25	4.12	34	0.30
940415	2006	1.36	0.093	10.7	48	73	0.83	1.70	2.98	58	0.89
940415	2306	1.50	0.093	10.7	58	71	0.80	2.01	3.38	42	0.83
940416	0206	1.57	0.074	13.6	48	68	0.76	2.47	3.65	36	1.05
940416	0506	1.46	0.074	13.6	50	69	0.78	2.43	3.59	41	1.20
940416	0803	1.37	0.074	13.6	52	73	0.78	2.15	3.38	45	0.99
940416	1106	1.51	0.074	13.6	46	69	0.81	2.16	3.26	48	0.97
940416	1706	1.52	0.083	12.0	54	70	0.75	2.37	3.79	36	1.01
940416	2007	1.54	0.083	12.0	66	77	0.75	1.72	3.36	40	0.56
940417	0204	1.49	0.083	12.0	50	70	0.77	2.25	3.68	39	0.63
940417	0751	1.38	0.083	12.0	50	76	0.81	1.69	2.92	55	0.76
940417	1103	1.32	0.083	12.0	58	77	0.75	1.79	3.20	45	1.08
940417	1403	1.28	0.083	12.0	58	78	0.74	1.68	3.26	44	0.93
940417	1701	1.28	0.083	12.0	60	77	0.76	1.63	3.15	48	1.02
940418	0501	0.92	0.083	12.0	48	90	0.90	0.83	1.92	99	1.33
940418	0808	0.92	0.074	13.6	60	92	0.88	0.64	1.99	93	0.96
940418	1148	0.93	0.093	10.7	68	87	0.82	1.11	2.54	73	1.15
940418	1407	0.97	0.083	12.0	60	83	0.83	1.14	2.56	71	1.14
940418	2005	1.53	0.162	6.2	62	66	0.70	1.22	3.69	41	-0.03
940419	1012	2.96	0.074	13.6	70	59	0.58	0.62	4.72	37	-0.46
940419	1401	3.09	0.083	12.0	74	62	0.54	0.34	4.61	36	-0.39
940419	1705	3.06	0.083	12.0	64	60	0.53	0.71	5.56	32	-0.15
940419	2002	2.97	0.083	12.0	66	60	0.51	0.73	5.52	32	-0.14
940420	0203	2.69	0.132	7.6	60	58	0.51	1.23	5.91	30	-0.17
940420	0503	2.64	0.123	8.2	64	64	0.49	1.21	6.07	29	-0.10
940420	0803	2.37	0.132	7.6	60	65	0.53	1.73	6.30	30	0.20
940420	1406	2.34	0.132	7.6	60	61	0.52	1.34	6.22	30	-0.01
940420	1710	2.24	0.132	7.6	64	63	0.52	1.02	5.90	28	-0.11
940420	2006	2.14	0.132	7.6	58	63	0.50	1.11	5.70	29	0.22
940421	0203	1.89	0.132	7.6	64	64	0.54	0.98	5.19	33	-0.02

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940421	0503	1.86	0.142	7.0	62	62	0.55	1.05	5.22	34	0.03
940421	0836	1.63	0.152	6.6	58	64	0.57	1.58	5.14	32	0.28
940421	1106	1.34	0.152	6.6	56	66	0.64	1.55	4.18	39	0.48
940421	1406	1.17	0.162	6.2	62	71	0.67	1.37	3.92	40	0.30
940421	1711	1.19	0.162	6.2	66	72	0.66	1.35	4.05	37	0.36
940421	2006	1.40	0.162	6.2	62	66	0.61	1.33	4.57	34	0.32
940422	0204	2.45	0.123	8.2	66	61	0.48	0.92	5.74	33	-0.24
940422	0506	2.33	0.123	8.2	76	66	0.50	1.08	5.79	32	-0.18
940422	0806	2.42	0.074	13.6	74	66	0.47	1.06	6.63	27	-0.32
940422	1106	2.48	0.074	13.6	64	66	0.46	1.28	7.35	25	0.03
940422	1406	2.61	0.074	13.6	76	70	0.44	0.77	7.00	25	-0.17
940422	1702	2.36	0.074	13.6	70	68	0.49	0.84	6.08	27	-0.07
940422	2002	2.16	0.074	13.6	64	69	0.50	1.29	6.74	25	0.09
940423	0202	2.48	0.083	12.0	68	71	0.48	1.02	6.44	25	0.03
940423	0502	2.45	0.083	12.0	68	70	0.45	1.17	7.88	20	0.08
940423	0802	2.34	0.083	12.0	66	69	0.45	1.84	8.49	18	0.10
940423	1102	2.12	0.083	12.0	62	69	0.52	1.75	6.61	24	0.32
940423	1402	1.85	0.083	12.0	68	72	0.55	1.47	5.57	27	0.12
940423	1702	1.69	0.083	12.0	74	75	0.61	1.26	4.89	25	0.01
940423	2002	1.54	0.083	12.0	68	76	0.59	1.93	5.36	23	0.46
940424	0202	2.17	0.083	12.0	74	·70	0.51	0.95	5.57	30	-0.20
940424	0502	2.25	0.093	10.7	70	68	0.52	0.78	4.98	33	-0.14
940424	0802	2.35	0.093	10.7	56	66	0.54	1.12	5.08	35	0.14
940424	1102	2.53	0.093	10.7	58	68	0.52	1.10	5.21	33	0.16
940424	1359	2.73	0.093	10.7	78	69	0.53	0.89	4.84	36	-0.08
940424	1702	2.79	0.093	10.7	52	66	0.56	0.87	4.39	44	0.18
940424	2000	2.68	0.093	10.7	56	67	0.58	1.05	4.76	37	0.15
940425	0159	2.33	0.093	10.7	58	70	0.55	1.40	5.15	34	0.38
940425	0459	2.20	0.064	15.6	56	73	0.63	1.48	4.20	40	0.58
940425	0803	1.99	0.093	10.7	64	77	0.69	1.31	3.69	44	0.60
940425	1102	2.15	0.074	13.6	60	76	0.63	1.25	3.82	40	0.65
940425	1403	2.28	0.074	13.6	60	77	0.63	1.02	3.71	45	0.52
940425	1703	2.27	0.113	8.9	76	78	0.60	1.01	4.27	34	0.06
940425	2002	2.24	0.113	8.9	70	75	0.60	1.32	4.73	28	0.20
940425	2302	2.55	0.093	10.7	58	70	0.57	1.63	5.07	30	0.33
940426	0202	3.61	0.074	13.6	54	65	0.49	1.44	5.95	29	0.66
940426	0502	4.06	0.074	13.6	52	64	0.50	1.38	5.73	31	0.65
940426	0802	3.95	0.064	15.6	68	⁻67	0.51	1.16	6.12	27	-0.01
940426	1102	3.83	0.074	13.6	58	65	0.49	1.35	6.69	25	0.20
940426	1403	4.03	0.064	15.6	56	65	0.50	1.15	6.35	29	0.31
940426	1703	3.87	0.064	15.6	58	67	0.54	1.36	5.58	30	0.34
940426	2003	3.46	0.074	13.6	52	65	0.54	1.31	5.64	32	0.12
940427	0203	3.62	0.074	13.6	56	64	0.50	1.32	6.12	28	0.37
940427	0503	3.72	0.083	12.0	64	67	0.49	1.09	6.19	29	0.08
940427	1010	3.22	0.083	12.0	58	62	0.54	1.45	5.97	31	0.18
940427	1354	3.18	0.083	12.0	54	60	0.55	1.36	5.20	35	0.28
940427	1652	3.27	0.083	12.0	48	62	0.59	1.18	4.40	44	0.85
940427	1952	3.08	0.093	10.7	56	59	0.57	1.43	5.22	35	0.05
940428	0152	3.07	0.093	10.7	42	57	0.53	1.37	5.50	35	0.42
940428	0453	3.01	0.093	10.7	56	64	0.55	1.27	5.04	37	0.54
940428	0752	2.46	0.093	10.7	54	65	0.58	1.18	4.87	40	0.47
940429	0158	1.46	0.103	9.7	58	66	0.68	1.34	3.77	45	0.31

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940429	0458	1.35	0.103	9.7	58	70	0.71	0.85	3.07	56	0.17
940429	0758	1.18	0.103	9.7	94	76	0.73	0.75	2.92	55	-0.26
940429	1147	1.02	0.103	9.7	88	79	0.72	1.00	3.24	48	-0.02
940429	1658	1.11	0.162	6.2	98	86	0.72	0.60	2.73	53	-0.38
940429	1958	1.22	0.152	6.6	98	77	0.69	0.60	2.91	54	-0.09
940430	0158	1.19	0.162	6.2	58	72	0.67	0.94	3.65	45	0.24
940430	0458	1.24	0.162	6.2	58	75	0.65	0.69	3.45	45	0.14
940430	0758	1.39	0.152	6.6	56	71	0.65	0.64	3.31	49	0.27
940430	1058	1.36	0.162	6.2	84	74	0.64	0.95	3.73	43	0.00
940430	1358	1.32	0.074	13.6	82	77	0.59	0.92	4.29	36	-0.09
940430	1658	1.34	0.074	13.6	58	76	0.64	0.45	3.49	43	0.06
940430	1958	1.55	0.074	13.6	64	71	0.60	0.35	3.91	42	0.03
940501	0458	1.82	0.083	12.0	52	62	0.54	0.86	4.70	37	0.37
940501	0758	1.82	0.162	6.2	52	60	0.55	0.70	4.18	40	0.33
940501	1058	1.72	0.083	12.0	56	66	0.52	0.84	5.25	36	0.19
940501	1358	1.71	0.083	12.0	58	65	0.52	0.95	5.32	32	0.30
940501	1658	1.92	0.162	6.2	54	64	0.56	0.53	3.75	43	0.48
940501	1958	2.33	0.142	7.0	54	60	0.55	0.47	3.80	42	0.21
940502	0158	2.28	0.132	7.6	58	57	0.46	0.74	5.82	32	-0.07
940502	0458	2.21	0.123	8.2	52	58	0.48	0.90	5.45	31	0.22
940502	0758	2.29	0.123	8.2	52	60	0.46	0.74	5.66	29	0.25
940502	1058	2.22	0.123	8.2	52	60	0.47	0.66	5.45	34	0.56
940502	1405	2.19	0.142	7.0	54	59	0.48	0.75	5.50	33	0.25
940502	1658	2.05	0.152	6.6	50	53	0.52	0.85	4.63	38	0.14
940503	0158	2.32	0.132	7.6	52	52	0.47	0.73	4.85	33	0.09
940503	0458	1.94	0.142	7.0	50	55	0.50	0.69	4.58	35	0.12
940503	0758	1.69	0.152	6.6	48	58	0.54	0.77	4.34	41	0.66
940503	1054	1.56	0.152	6.6	46	57	0.53	1.08	4.88	34	0.75
940503	1652	1.32	0.093	10.7	56	63	0.55	0.94	4.88	34	0.43
940503	1953	1.32	0.103	9.7	52	64	0.56	0.93	4.91	36	0.81
940504	0141	1.84	0.152	6.6	56	56	0.48	0.84	5.16	29	-0.06
940505	1921	1.34	0.064	15.6	66	68	0.53	1.47	6.81	27	0.22
940506	0146	1.49	0.064	15.6	70	72	0.50	1.15	5.91	26	0.26
940506	0452	1.38	0.064	15.6	66	76	0.58	1.28	4.81	33	0.40
940506	0752	1.50	0.064	15.6	68	74	0.57	1.55	5.34	29	0.44
940506	1652	1.77	0.103	9.7	64	72	0.51	1.20	6.10	27	0.46
940506	1950	1.71	0.074	13.6	64	75	0.59	1.35	5.00	34	0.68
940507	0152	1.64	0.103	9.7	60	73	0.57	1.16	4.79	38	0.77
940507	0452	1.67	0.103	9.7	62	74	0.57	1.03	4.71	38	0.50
940507	0752	1.76	0.103	9.7	62	78	0.56	0.84	4.29	42	0.60
940507	1052	1.75	0.103	9.7	58	80	0.60	0.89	4.02	46	0.34
940507	1352	1.72	0.113	8.9	108	83	0.61	0.48	3.57	51	-0.09
940507	1652	1.61	0.113	8.9	106	84	0.62	0.33	3.56	49	-0.32
940507	1952	1.58	0.103	9.7	62	80	0.62	0.71	3.73	48	0.42
940508	0152	1.21	0.103	9.7	56	80	0.67	1.03	3.56	49	0.26
940508	0453	1.23	0.093	10.7	56	76	0.71	1.01	3.38	52	0.63
940508	0752	1.12	0.103	9.7	56	78	0.69	1.07	3.52	48	0.35
940508	1042	1.20	0.093	10.7	52	76	0.72	1.37	3.29	53	1.08
940508	1345	1.28	0.093	10.7	62	76	0.63	1.21	4.09	42	0.74
940508	1652	1.26	0.064	15.6	66	74	0.65	1.11	3.91	43	0.58
940508	1945	1.27	0.064	15.6	62	70	0.64	1.21	4.26	38	0.74

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940509	0152	1.93	0.074	13.6	56	60	0.59	1.40	4.87	34	0.25
940509	0452	1.78	0.074	13.6	56	68	0.61	1.17	4.22	40	0.58
940509	0752	1.70	0.074	13.6	60	69	0.63	0.91	3.79	48	0.54
940509	1052	1.68	0.074	13.6	56	76	0.65	0.74	3.36	52	0.87
940509	1353	1.60	0.074	13.6	54	79	0.68	0.74	3.13	57	0.53
940509	1653	1.38	0.083	12.0	54	76	0.67	1.02	3.48	51	0.71
940509	1953	1.31	0.074	13.6	54	75	0.70	1.42	3.72	41	0.43
940510	0152	1.66	0.064	15.6	62	76	0.62	1.43	4.22	37	0.88
940510	0452	1.82	0.074	13.6	62	75	0.59	1.58	4.90	31	0.74
940510	0758	1.83	0.074	13.6	68	73	0.54	1.81	6.04	19	0.41
940510	1052	1.88	0.074	13.6	64	75	0.58	1.43	4.66	31	0.91
940510	1352	1.89	0.074	13.6	64	71	0.58	1.48	4.98	27	0.46
940510	1652	2.05	0.074	13.6	60	73	0.60	1.67	5.07	32	0.19
940510	1944	1.92	0.074	13.6	62	72	0.62	1.82	4.85	30	0.34
940511	0152	1.74	0.083	12.0	56	76	0.72	1.38	3.32	47	0.76
940511	0452	1.95	0.083	12.0	68	77	0.66	1.50	3.97	36	0.27
940511	0753	2.15	0.083	12.0	60	67	0.64	1.86	4.58	36	0.10
940511	1350	2.11	0.162	6.2	62	68	0.69	1.41	3.58	47	0.27
940511	1652	2.22	0.132	7.6	52	63	0.65	1.19	3.93	47	0.40
940512	0153	2.37	0.123	8.2	40	61	0.65	1.97	4.51	39	0.34
940512	0453	2.36	0.123	8.2	46	58	0.66	2.28	4.86	36	0.53
940512	0754	2.18	0.123	8.2	42	66	0.71	1.93	3.77	45	0.59
940512	1053	2.00	0.123	8.2	50	66	0.75	1.89	3.62	50	0.79
940512	1358	2.20	0.123	8.2	48	67	0.75	1.85	3.57	49	0.76
940512	1719	2.26	0.113	8.9	48	64	0.75	1.79	3.59	48	0.56
940512	1957	2.66	0.113	8.9	46	56	0.63	2.13	5.06	35	0.44
940513	0458	3.01	0.103	9.7	50	58	0.55	1.65	5.55	34	0.27
940513	0759	3.31	0.103	9.7	60	60	0.52	1.42	6.02	32	0.03
940513	1057	3.12	0.103	9.7	58	62	0.52	1.24	5.65	33	0.19
940513	1703	3.76	0.083	12.0	58	63	0.49	1.13	6.34	30	0.10
940513	2000	3.54	0.093	10.7	52	59	0.52	1.42	6.30	31	0.29
940513	2300	3.46	0.093	10.7	54	59	0.50	1.29	6.51	32	0.18
940514	0200	3.03	0.103	9.7	58	62	0.52	1.37	6.16	30	0.28
940514	0500	3.09	0.103	9.7	58	63	0.53	1.14	5.46	32	0.40
940514	2301	2.23	0.132	7.6	50	60	0.58	1.95	5.70	32	0.43
940515	0500	2.01	0.093	10.7	56	65	0.67	1.56	4.10	44	0.50
940515	0802	1.76	0.093	10.7	58	68	0.66	1.43	4.00	43	0.54
940515	1101	1.54	0.093	10.7	60	77	0.73	1.63	3.60	44	0.92
940515	1401	1.65	0.064	15.6	58	73	0.78	1.62	3.30	49	0.74
940515	1701	1.74	0.074	13.6	64	72	0.68	1.82	4.34	32	0.55
940515	2001	1.83	0.074	13.6	64	68	0.62	1.55	5.03	30	0.14
940515	2302	1.90	0.162	6.2	62	66	0.62	1.51	4.81	34	0.12
940516	0501	2.19	0.142	7.0	58	68	0.55	1.17	5.03	32	0.26
940516	0805	2.60	0.083	12.0	58	63	0.47	1.54	6.94	22	0.38
940516	1056	2.48	0.083	12.0	56	62	0.49	1.84	7.00	23	0.38
940516	1401	2.38	0.083	12.0	58	63	0.52	1.32	5.93	27	0.22
940516	1957	2.09	0.093	10.7	52	61	0.56	1.60	5.71	31	0.44
940517	0157	1.92	0.093	10.7	58	66	0.57	2.19	6.03	26	0.43
940517	1955	2.21	0.103	9.7	64	75	0.53	1.16	5.32	31	0.38
940518	0154	1.97	0.093	10.7	58	74	0.61	1.34	4.41	42	0.97
940518	0756	2.16	0.103	9.7	54	69	0.58	1.53	5.11	37	0.74

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940519	0200	2.06	0.103	9.7	60	71	0.65	1.94	4.49	33	0.60
940519	0801	1.74	0.064	15.6	58	69	0.69	2.38	4.44	33	0.73
940519	1121	1.76	0.064	15.6	62	66	0.66	2.00	4.57	31	0.35
940519	1402	1.54	0.074	13.6	58	71	0.80	2.12	3.41	45	0.81
940519	1706	1.63	0.074	13.6	58	76	0.80	1.57	2.87	59	1.20
940519	2004	1.73	0.074	13.6	58	66	0.69	2.62	4.54	24	0.44
940519	2258	1.66	0.074	13.6	56	67	0.69	2.82	4.63	24	0.74
940520	0204	1.49	0.074	13.6	56	70	0.77	2.25	3.61	35	1.10
940520	0504	1.43	0.074	13.6	54	73	0.78	1.91	3.25	49	1.28
940520	0817	1.46	0.074	13.6	54	75	0.74	1.51	3.20	52	1.12
940520	1125	1.42	0.074	13.6	52	71	0.75	2.01	3.62	43	0.79
940520	1406	1.42	0.074	13.6	52	71	0.74	1.72	3.42	45	0.76
940520	1711	1.62	0.162	6.2	50	65	0.72	1.71	3.80	44	0.68
940520	2001	1.82	0.162	6.2	54	63	0.69	1.94	4.34	37	0.26
940520	2304	1.80	0.152	6.6	56	62	0.68	1.74	4.33	39	0.30
940521	0204	1.79	0.142	7.0	56	63	0.70	1.97	4.14	39	0.31
940521	0504	1.68	0.142	7.0	56	63	0.68	2.20	4.57	35	0.20
940521	0802	1.83	0.142	7.0	48	63	0.67	1.97	4.52	38	0.29
940521	1102	1.96	0.132	7.6	46	59	0.61	2.28	5.44	33	0.43
940521	1405	1.84	0.142	7.0	52	58	0.65	2.26	5.05	34	0.21
940521	1702	1.68	0.142	7.0	54	57	0.74	2.52	4.27	38	0.09
940521	2004	1.83	0.142	7.0	50	58	0.70	2.19	4.34	37	0.37
940521	2304	1.96	0.142	7.0	54	58	0.63	1.74	4.97	37	0.10
940522	0204	1.82	0.142	7.0	56	57	0.60	1.87	5.29	35	0.03
940522	0504	1.61	0.142	7.0	50	58	0.68	2.29	4.59	37	0.39
940522	0804	1.48	0.142	7.0	50	61	0.72	2.14	3.96	43	0.62
940522	1104	1.45	0.142	7.0	48	63	0.73	2.20	3.93	42	0.82
940522	1420	1.41	0.142	7.0	52	62	0.70	2.05	4.21	39	0.60
940522	1704	1.38	0.152	6.6	50	67	0.75	1.79	3.50	46	0.87
940522	2004	1.33	0.142	7.0	48	68	0.81	1.88	3.10	54	1.22
940522	2304	1.26	0.152	6.6	54	69	0.79	1.86	3.20	48	0.84
940523	1130	1.54	0.132	7.6	44	71	0.78	1.62	3.10	55	0.97
940523	1429	1.49	0.064	15.6	44	68	0.78	1.62	3.12	55	1.13
940523	1704	1.61	0.064	15.6	50	65	0.75	2.04	3.56	44	1.05
940523	2002	1.90	0.064	15.6	58	61	0.66	2.18	4.78	27	0.13
940524	0204	1.98	0.064	15.6	46	62	0.68	1.79	4.05	42	0.62
940524	0504	2.07	0.074	13.6	50	60	0.67	2.39	4.71	32	0.78
940524	0804	2.32	0.074	13.6	50	57	0.61	2.69	5.72	25	0.41
940524	1103	2.53	0.113	8.9	46	54	0.54	2.77	7.02	20	0.41
940524	1403	2.33	0.113	8.9	42	54	0.63	2.88	5.70	27	0.81
940524	1700	2.39	0.074	13.6	52	56	0.61	2.06	5.31	33	0.35
940524	2003	2.22	0.103	9.7	58	65	0.63	2.31	5.22	28	0.26
940525	0203	1.78	0.074	13.6	52	61	0.67	2.19	4.71	31	0.61
940525	0503	1.68	0.074	13.6	48	63	0.71	1.95	4.14	39	1.24
940525	1329	1.77	0.113	8.9	42	58	0.69	2.32	4.49	40	1.35
940525	1711	1.83	0.103	9.7	50	58	0.67	1.97	4.51	39	0.62
940525	1957	1.66	0.103	9.7	48	61	0.70	2.23	4.32	36	0.98
940526	0201	1.69	0.093	10.7	46	63	0.74	2.07	3.83	44	1.26
940526	0447	1.69	0.074	13.6	50	61	0.65	2.30	4.70	32	0.64
940526	2001	2.21	0.093	10.7	48	55	0.55	2.23	6.28	23	0.38
940527	1755	2.09	0.093	10.7	44	55	0.59	2.28	5.69	31	0.69

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Appendix A   Table of Collection Times and Bulk Parameters

A17

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940528	0158	1.91	0.093	10.7	44	55	0.55	2.49	6.58	21	0.63
940528	0458	1.76	0.093	10.7	44	56	0.55	2.07	5.84	28	0.81
940528	0758	1.92	0.093	10.7	46	55	0.52	1.86	6.60	27	0.79
940528	1058	2.00	0.093	10.7	50	56	0.49	1.89	7.08	25	0.32
940528	1701	2.14	0.093	10.7	48	56	0.50	2.01	6.90	23	0.58
940529	0201	1.94	0.113	8.9	50	57	0.49	2.18	7.63	21	0.48
940529	0458	2.13	0.113	8.9	50	56	0.48	2.56	8.26	17	0.43
940529	0801	2.00	0.113	8.9	46	56	0.50	2.22	7.47	23	0.70
940529	1100	1.91	0.123	8.2	44	55	0.54	2.02	6.55	29	0.79
940530	0158	1.44	0.123	8.2	48	62	0.67	2.23	4.50	34	0.92
940530	0458	1.65	0.123	8.2	46	62	0.65	2.05	4.87	40	1.29
940530	0758	1.70	0.103	9.7	48	65	0.63	1.67	4.73	41	0.95
940530	1058	1.93	0.103	9.7	46	59	0.60	1.47	5.09	39	0.55
940530	1355	1.97	0.093	10.7	50	59	0.54	1.90	6.48	29	0.46
940530	1658	2.16	0.093	10.7	50	63	0.54	2.18	6.97	29	0.49
940530	1955	2.29	0.093	10.7	48	62	0.52	1.80	6.80	32	0.59
940531	0158	1.96	0.083	12.0	50	61	0.61	3.36	6.40	24	0.50
940531	0455	1.74	0.083	12.0	52	66	0.63	2.94	5.49	26	0.72
940531	1358	1.84	0.083	12.0	52	64	0.62	2.23	5.45	32	0.36
940531	1658	1.76	0.093	10.7	48	62	0.61	2.35	5.78	34	0.60
940601	0501	1.36	0.093	10.7	58	60	0.64	1.78	4.98	37	0.05
940601	0801	1.69	0.152	6.6	60	58	0.57	1.37	5.43	36	-0.05
940601	1059	2.02	0.132	7.6	60	57	0.51	0.85	5.93	34	-0.11
940601	1701	2.39	0.132	7.6	46	49	0.50	0.68	5.33	37	0.08
940601	2001	2.52	0.132	7.6	48	51	0.50	0.77	5.42	36	0.08
940602	0202	2.48	0.083	12.0	52	54	0.45	0.72	6.87	28	-0.06
940602	0502	2.48	0.132	7.6	52	54	0.44	0.78	7.10	27	-0.03
940602	0759	2.66	0.132	7.6	50	54	0.45	0.72	6.38	30	0.21
940602	1056	2.65	0.123	8.2	50	55	0.43	0.54	6.36	31	0.12
940602	1411	2.60	0.123	8.2	54	55	0.44	0.32	6.07	32	0.02
940602	1703	2.70	0.132	7.6	58	51	0.48	0.43	5.48	37	-0.21
940602	2001	2.69	0.132	7.6	64	51	0.48	0.36	5.13	38	-0.08
940603	0159	2.59	0.123	8.2	50	49	0.46	0.63	5.29	35	-0.06
940603	0502	2.28	0.123	8.2	58	51	0.46	0.54	5.48	34	-0.02
940603	0802	2.10	0.123	8.2	34	52	0.46	0.60	5.53	36	0.06
940603	1403	1.90	0.142	7.0	28	53	0.49	0.47	4.94	41	-0.14
940603	1657	2.01	0.142	7.0	28	47	0.49	0.71	4.86	37	0.22
940603	2001	1.90	0.142	7.0	24	49	0.51	0.59	4.55	41	0.09
940604	0202	1.79	0.142	7.0	20	50	0.53	0.53	4.14	44	-0.38
940604	0502	1.54	0.152	6.6	26	49	0.52	0.92	5.10	38	0.08
940604	0801	1.37	0.142	7.0	28	52	0.53	0.96	5.29	38	0.11
940604	1101	1.14	0.162	6.2	24	53	0.60	0.90	4.71	44	0.05
940604	1401	1.14	0.162	6.2	66	60	0.61	0.75	4.34	44	-0.08
940604	1701	1.10	0.162	6.2	56	54	0.58	0.95	4.54	41	-0.02
940604	2001	1.12	0.162	6.2	64	61	0.56	0.88	5.08	34	-0.10
940605	0202	1.38	0.162	6.2	52	56	0.52	0.85	5.29	36	0.06
940605	0459	1.29	0.152	6.6	54	54	0.52	0.82	5.18	36	0.02
940605	0802	1.25	0.162	6.2	56	57	0.52	0.92	5.83	34	-0.02
940605	1101	1.16	0.162	6.2	60	63	0.57	1.12	5.21	35	0.05
940605	1359	1.23	0.162	6.2	64	65	0.59	1.21	4.80	34	0.05
940605	1659	1.17	0.162	6.2	60	69	0.63	1.12	3.79	37	0.43
940605	2001	0.97	0.093	10.7	52	63	0.68	1.49	4.17	38	0.35

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940606	0202	0.81	0.103	9.7	68	74	0.68	1.10	3.71	43	0.28
940606	0502	0.77	0.103	9.7	64	75	0.72	1.04	3.11	50	0.48
940606	0756	0.75	0.113	8.9	66	74	0.77	0.91	2.79	61	0.39
940606	1103	0.77	0.113	8.9	56	77	0.78	0.70	2.53	69	0.57
940606	1359	1.19	0.162	6.2	62	69	0.64	0.63	3.51	48	0.17
940606	1703	1.90	0.162	6.2	56	59	0.54	0.64	4.45	42	0.06
940606	1959	2.08	0.142	7.0	28	52	0.51	0.86	4.77	39	0.17
940607	0201	2.79	0.123	8.2	56	53	0.46	0.81	4.81	33	0.03
940607	0502	2.93	0.123	8.2	56	58	0.42	0.52	5.22	30	0.09
940607	0802	2.84	0.113	8.9	54	59	0.44	0.36	4.89	35	0.06
940607	1103	2.70	0.123	8.2	52	59	0.46	0.73	5.13	32	0.15
940607	1403	2.70	0.123	8.2	50	59	0.48	0.66	5.19	34	0.33
940607	1701	3.03	0.113	8.9	50	60	0.45	0.48	4.86	34	0.21
940607	2001	3.05	0.103	9.7	46	56	0.43	0.65	5.06	33	0.37
940608	0202	3.22	0.103	9.7	50	56	0.39	0.51	5.88	28	0.25
940608	0502	2.81	0.113	8.9	52	56	0.43	0.61	5.65	32	0.16
940608	0802	2.40	0.113	8.9	48	56	0.45	0.65	6.06	33	0.12
940608	1101	2.23	0.113	8.9	54	61	0.45	1.02	6.41	26	0.16
940608	1359	2.31	0.113	8.9	56	64	0.50	0.62	5.38	34	0.13
940608	1701	2.22	0.123	8.2	46	61	0.51	0.60	4.58	39	0.46
940608	2001	2.15	0.123	8.2	64	65	0.48	0.38	5.25	34	-0.02
940609	0201	2.16	0.113	8.9	50	60	0.46	1.14	6.77	29	0.40
940609	0459	2.21	0.113	8.9	56	63	0.48	1.02	6.75	29	0.19
940609	0801	2.07	0.113	8.9	46	62	0.50	1.33	6.22	33	0.31
940609	1402	2.09	0.123	8.2	62	71	0.55	0.76	4.70	39	0.11
940609	1701	1.85	0.123	8.2	50	69	0.57	1.16	4.67	39	0.05
940609	2003	1.69	0.113	8.9	70	68	0.59	1.25	4.94	37	-0.15
940610	0201	1.39	0.113	8.9	56	76	0.68	1.24	3.76	43	0.28
940610	0502	1.49	0.113	8.9	54	73	0.68	1.54	3.73	40	0.47
940610	0801	1.42	0.113	8.9	56	76	0.72	1.08	3.20	46	0.14
940610	1059	1.37	0.074	13.6	54	79	0.78	1.11	2.80	53	0.59
940610	1701	1.51	0.083	12.0	46	77	0.75	1.35	3.11	50	0.10
940610	2002	1.43	0.074	13.6	58	81	0.78	1.28	2.76	59	0.83
940611	0202	1.32	0.074	13.6	56	86	0.78	1.19	2.58	78	1.33
940611	0501	1.36	0.083	12.0	52	81	0.79	1.39	2.77	62	0.87
940611	0759	1.34	0.083	12.0	56	91	0.89	0.82	2.04	95	1.04
940611	1101	1.32	0.083	12.0	48	82	0.86	1.27	2.41	86	1.07
940611	1401	1.44	0.083	12.0	52	81	0.83	1.38	2.54	80	1.23
940611	1702	1.34	0.093	10.7	52	88	0.85	1.13	2.20	94	1.30
940611	2001	1.21	0.064	15.6	62	99	0.87	0.65	1.80	96	1.31
940612	0159	1.27	0.064	15.6	56	97	0.90	0.67	1.78	98	1.23
940612	0502	1.25	0.064	15.6	54	87	0.87	1.16	2.22	94	1.33
940612	0801	1.30	0.064	15.6	54	84	0.86	1.28	2.28	95	1.52
940612	1101	1.22	0.064	15.6	56	89	0.87	1.15	2.18	95	1.64
940612	1359	1.37	0.083	12.0	52	76	0.78	1.77	3.10	52	1.04
940612	1702	1.80	0.123	8.2	52	71	0.71	1.90	3.61	39	0.54
940612	2001	1.76	0.113	8.9	54	67	0.66	1.97	4.35	34	0.47
940613	0201	1.95	0.123	8.2	44	58	0.61	2.02	5.40	33	0.22
940613	0502	1.97	0.123	8.2	48	60	0.57	2.00	5.79	31	0.32
940613	0802	1.77	0.132	7.6	44	61	0.62	2.39	5.26	33	0.41
940613	1102	1.56	0.132	7.6	56	60	0.59	2.16	5.84	30	0.04
940613	1403	1.53	0.132	7.6	42	58	0.62	2.07	5.21	34	0.36
940613	1703	1.87	0.142	7.0	40	57	0.57	1.22	5.01	39	0.04

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_o deg	σ	γ	δ	$\Delta\theta$ deg	A
940613	2003	1.79	0.142	7.0	34	58	0.56	1.08	5.26	39	0.00
940614	0202	2.12	0.123	8.2	44	52	0.48	1.22	6.46	31	0.23
940614	0459	2.17	0.123	8.2	50	55	0.45	1.66	8.24	24	0.23
940614	0801	2.18	0.123	8.2	48	57	0.45	2.25	8.70	22	0.45
940614	1102	2.34	0.113	8.9	48	58	0.47	1.85	7.34	25	0.45
940614	1358	2.37	0.113	8.9	48	55	0.45	1.37	7.45	25	0.42
940614	1710	2.70	0.103	9.7	48	58	0.46	1.24	6.72	29	0.66
940614	2001	3.00	0.103	9.7	48	59	0.43	0.94	6.80	29	0.37
940615	0202	3.03	0.103	9.7	48	57	0.40	1.19	8.31	25	0.51
940615	0502	3.04	0.103	9.7	50	59	0.40	1.13	8.32	24	0.45
940615	0801	3.09	0.093	10.7	52	61	0.41	1.05	7.48	26	0.42
940615	1101	3.12	0.103	9.7	54	60	0.40	0.79	7.60	27	0.17
940615	1401	2.82	0.093	10.7	52	59	0.41	0.76	7.42	26	0.23
940615	1703	2.75	0.093	10.7	50	59	0.42	0.70	6.74	29	0.35
940615	2001	2.86	0.093	10.7	52	57	0.43	0.71	6.70	29	0.22
940616	0204	2.59	0.113	8.9	48	54	0.44	0.84	5.96	30	0.37
940616	0504	2.31	0.113	8.9	52	59	0.45	0.96	6.36	29	0.48
940616	0807	2.10	0.123	8.2	52	60	0.42	1.29	8.12	25	0.60
940616	1104	2.13	0.123	8.2	52	58	0.43	1.51	8.77	23	0.38
940616	1401	1.95	0.123	8.2	48	56	0.45	1.33	7.33	26	0.47
940616	1704	2.15	0.132	7.6	50	57	0.46	0.68	6.21	30	0.36
940616	2004	2.19	0.132	7.6	54	55	0.46	0.37	5.82	29	0.10
940617	0204	2.00	0.123	8.2	48	52	0.48	0.78	5.75	31	0.16
940617	0454	1.95	0.123	8.2	48	54	0.46	0.94	6.23	29	0.28
940617	0805	2.03	0.123	8.2	50	54	0.43	0.92	7.16	25	0.21
940617	1049	2.17	0.123	8.2	54	55	0.41	0.70	6.83	27	0.02
940617	1400	1.96	0.123	8.2	52	57	0.44	0.97	7.12	26	0.24
940617	1700	1.92	0.123	8.2	52	58	0.45	1.06	7.22	27	0.27
940617	1956	2.05	0.123	8.2	54	57	0.46	0.90	7.05	25	0.19
940618	0202	2.22	0.113	8.9	52	52	0.46	1.18	6.54	25	-0.06
940618	0502	2.15	0.113	8.9	50	54	0.47	1.79	7.30	23	0.29
940618	0803	2.28	0.113	8.9	48	56	0.49	1.80	6.72	27	0.51
940618	1052	2.33	0.123	8.2	48	59	0.51	1.38	5.65	34	0.49
940618	1351	2.29	0.113	8.9	46	60	0.54	1.42	5.22	35	0.43
940618	1702	1.98	0.123	8.2	48	57	0.59	1.64	5.23	32	0.37
940618	2002	1.92	0.123	8.2	42	55	0.59	1.73	5.21	35	0.46
940619	0202	1.68	0.123	8.2	46	61	0.70	1.92	3.86	41	0.62
940619	0502	1.55	0.123	8.2	46	65	0.72	1.78	3.47	45	0.79
940619	0802	1.44	0.123	8.2	48	70	0.76	1.84	3.37	43	0.38
940619	1102	1.40	0.123	8.2	44	69	0.80	1.77	2.95	53	0.89
940619	1359	1.40	0.123	8.2	42	77	0.86	1.32	2.32	96	1.26
940619	1702	1.40	0.113	8.9	44	74	0.88	1.64	2.46	93	1.64
940619	2001	1.34	0.123	8.2	46	76	0.88	1.43	2.34	99	1.72
940620	0201	1.38	0.064	15.6	42	78	0.87	1.18	2.20	104	1.38
940620	0457	1.39	0.064	15.6	42	80	0.92	1.09	1.94	112	1.51
940620	0802	1.30	0.064	15.6	40	83	0.95	0.94	1.86	112	1.31
940620	1111	1.27	0.064	15.6	38	91	0.95	0.60	1.63	114	0.97
940620	1405	1.24	0.064	15.6	170	97	0.96	0.38	1.55	114	0.77
940620	1703	1.16	0.064	15.6	44	95	0.96	0.55	1.62	113	0.94
940620	2003	1.18	0.064	15.6	42	93	0.99	0.60	1.63	116	0.96
940621	0203	1.48	0.152	6.6	48	76	0.85	1.36	2.54	67	0.83
940621	0500	1.56	0.142	7.0	44	70	0.84	1.79	2.81	59	1.06

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_o deg	σ	γ	δ	Δθ deg	A
940621	0801	1.59	0.152	6.6	46	63	0.77	2.31	3.61	43	0.95
940621	1102	1.67	0.142	7.0	44	61	0.76	2.41	3.73	45	1.28
940621	1402	1.57	0.142	7.0	44	65	0.79	2.19	3.41	48	0.84
940621	1716	1.68	0.142	7.0	44	61	0.77	2.12	3.64	47	0.61
940621	2000	1.57	0.142	7.0	48	64	0.84	2.35	3.27	44	0.80
940622	0200	1.53	0.132	7.6	44	72	0.89	1.56	2.46	86	1.37
940622	0500	1.62	0.132	7.6	50	70	0.81	1.44	2.88	55	0.43
940622	0814	1.64	0.132	7.6	34	68	0.88	1.63	2.56	69	0.87
940622	1114	1.53	0.142	7.0	42	68	0.89	1.79	2.61	77	1.44
940622	1704	1.39	0.152	6.6	34	77	0.94	1.21	2.08	113	1.19
940622	2004	1.30	0.142	7.0	42	72	0.94	1.44	2.21	110	1.56
940623	0201	1.55	0.132	7.6	38	65	0.81	1.72	3.07	53	0.46
940623	0504	1.70	0.132	7.6	40	59	0.69	2.58	4.45	38	0.72
940623	0808	1.73	0.132	7.6	42	57	0.69	2.94	4.72	32	0.70
940623	1108	1.72	0.123	8.2	42	61	0.70	2.14	4.19	41	0.66
940623	1406	1.75	0.132	7.6	40	59	0.72	2.09	3.96	46	0.88
940623	1712	1.93	0.132	7.6	42	56	0.62	1.79	4.86	40	0.66
940623	2004	1.96	0.132	7.6	44	56	0.60	2.32	5.84	33	0.50
940624	0201	2.09	0.123	8.2	42	56	0.55	1.71	5.62	37	0.66
940624	0501	2.10	0.113	8.9	38	58	0.52	1.73	6.26	35	0.25
940624	0801	2.05	0.123	8.2	44	58	0.54	1.74	6.13	34	0.51
940624	1103	1.96	0.123	8.2	42	57	0.57	2.08	5.85	33	0.25
940624	1406	2.04	0.123	8.2	42	54	0.55	2.12	6.17	30	0.36
940624	1702	2.38	0.123	8.2	46	52	0.48	1.58	7.21	28	0.18
940625	0150	2.30	0.113	8.9	44	52	0.51	2.26	7.37	25	0.49
940625	0502	2.25	0.113	8.9	44	55	0.57	2.32	5.86	31	0.44
940625	0802	2.14	0.113	8.9	44	57	0.55	2.31	6.14	29	0.58
940625	1101	2.12	0.113	8.9	40	53	0.53	2.28	6.83	28	0.64
940625	1401	2.44	0.113	8.9	38	49	0.54	2.05	6.38	31	0.45
940625	1658	2.79	0.113	8.9	52	50	0.52	1.77	6.34	31	0.00
940625	2004	2.65	0.113	8.9	44	52	0.53	2.79	7.41	24	0.32
940626	0202	2.49	0.113	8.9	42	50	0.52	2.85	7.62	23	0.53
940626	0502	2.19	0.113	8.9	44	53	0.58	2.89	6.32	26	0.41
940626	0804	2.21	0.113	8.9	50	57	0.58	2.74	6.29	25	0.34
940626	1102	2.02	0.113	8.9	48	57	0.59	2.35	5.84	30	0.36
940626	1401	2.04	0.123	8.2	48	56	0.60	2.47	5.98	29	0.20
940626	1704	1.85	0.123	8.2	40	54	0.64	2.09	5.03	36	0.35
940626	2004	1.76	0.113	8.9	50	58	0.59	2.51	5.74	26	0.37
940627	0204	1.61	0.123	8.2	48	59	0.62	2.23	5.19	30	0.49
940627	0504	1.33	0.123	8.2	38	61	0.69	1.92	4.16	44	0.58
940627	0823	1.28	0.132	7.6	52	63	0.65	2.14	4.73	34	0.47
940627	1410	1.32	0.123	8.2	60	64	0.64	1.89	4.55	37	0.15
940627	1704	1.38	0.132	7.6	58	61	0.61	1.93	5.16	33	0.10
940627	2004	1.46	0.142	7.0	44	54	0.58	1.88	5.66	32	0.32
940628	0205	1.43	0.132	7.6	52	55	0.59	2.29	6.03	26	0.05
940628	0504	1.41	0.142	7.0	56	57	0.59	2.02	5.85	29	0.07
940628	0801	1.35	0.142	7.0	46	58	0.60	2.02	5.48	31	0.62
940628	1407	1.17	0.152	6.6	48	60	0.66	2.12	4.82	34	0.49
940628	1703	1.15	0.152	6.6	44	63	0.70	1.76	4.12	45	0.62
940628	2004	1.26	0.162	6.2	46	57	0.60	1.77	5.25	36	0.41
940629	0204	1.56	0.142	7.0	52	53	0.52	1.73	6.53	27	-0.02
940629	0504	2.00	0.123	8.2	46	50	0.49	2.05	7.54	23	0.20

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940629	0813	2.31	0.123	8.2	42	49	0.44	1.61	7.97	24	0.48
940629	1107	2.31	0.113	8.9	42	48	0.41	1.52	8.64	23	0.40
940629	1410	2.12	0.113	8.9	40	47	0.45	1.95	8.03	22	0.51
940629	2001	2.47	0.113	8.9	42	52	0.43	0.87	6.15	31	0.44
940630	0159	2.06	0.113	8.9	42	50	0.40	1.74	9.21	22	0.47
940630	0502	2.11	0.113	8.9	40	48	0.44	1.55	7.92	24	0.44
940630	0803	2.02	0.113	8.9	40	48	0.44	1.61	8.34	24	0.44
940630	1100	1.93	0.113	8.9	42	49	0.44	2.21	9.32	20	0.41
940630	1400	2.09	0.113	8.9	44	47	0.39	2.08	11.78	16	0.32
940630	1704	2.00	0.113	8.9	46	53	0.43	1.81	9.29	22	0.43
940630	2001	2.15	0.113	8.9	46	52	0.42	1.76	9.64	21	0.50
940701	0204	1.94	0.113	8.9	44	51	0.45	2.19	8.98	21	0.47
940701	0804	1.81	0.113	8.9	50	57	0.46	2.66	9.87	19	0.63
940701	1100	1.75	0.113	8.9	46	54	0.52	2.26	7.80	25	0.52
940701	1403	1.72	0.123	8.2	42	49	0.50	2.14	8.03	24	0.44
940701	2001	1.93	0.123	8.2	48	53	0.49	1.07	6.80	31	0.03
940702	0202	1.91	0.132	7.6	42	50	0.49	1.32	6.77	32	0.13
940702	1059	1.77	0.123	8.2	42	51	0.48	2.86	9.30	21	0.55
940702	1403	1.88	0.123	8.2	42	49	0.48	2.79	9.34	19	0.46
940702	2002	1.70	0.113	8.9	46	57	0.62	2.73	6.11	28	0.36
940703	0202	1.61	0.123	8.2	42	56	0.74	3.28	4.77	34	0.58
940703	0502	1.69	0.132	7.6	38	56	0.73	2.84	4.72	36	0.34
940703	0802	1.66	0.142	7.0	42	57	0.77	3.01	4.24	37	0.58
940703	1359	1.46	0.132	7.6	50	72	0.77	1.87	3.57	45	0.46
940703	2002	1.69	0.113	8.9	48	68	0.74	2.23	3.95	40	0.47
940704	0202	1.72	0.113	8.9	44	64	0.71	2.37	4.39	36	0.31
940704	0502	1.77	0.103	9.7	44	66	0.74	2.01	3.80	41	0.29
940704	0802	1.80	0.103	9.7	40	61	0.70	1.97	4.31	38	0.23
940704	1101	1.90	0.113	8.9	42	62	0.67	1.97	4.50	38	0.32
940704	1400	2.07	0.103	9.7	44	65	0.67	1.70	4.26	42	0.50
940704	1703	2.03	0.103	9.7	46	68	0.68	1.64	4.16	42	0.27
940704	2002	1.84	0.103	9.7	40	65	0.73	1.75	3.74	45	0.45
940705	0202	1.65	0.113	8.9	40	60	0.73	2.53	4.22	40	0.71
940705	0503	1.83	0.113	8.9	44	60	0.69	2.49	4.45	35	0.54
940705	0802	1.69	0.103	9.7	42	61	0.76	2.58	3.80	41	1.25
940705	1102	1.73	0.103	9.7	46	61	0.74	2.66	4.01	38	1.05
940705	2005	1.62	0.103	9.7	46	61	0.75	2.82	4.13	35	0.89
940706	0157	1.74	0.103	9.7	46	58	0.70	3.07	4.78	31	0.88
940706	0834	1.59	0.093	10.7	46	59	0.69	2.82	4.72	31	0.72
940706	1104	1.78	0.093	10.7	42	55	0.65	3.17	5.55	27	0.76
940706	1402	1.63	0.103	9.7	46	59	0.66	2.62	4.94	30	0.75
940706	1702	1.54	0.093	10.7	44	57	0.67	2.75	5.01	32	0.93
940706	2003	1.43	0.103	9.7	46	62	0.69	2.54	4.63	33	0.69
940707	0202	1.37	0.103	9.7	48	60	0.63	2.77	5.36	27	0.65
940707	0502	1.27	0.103	9.7	44	61	0.68	2.04	4.34	37	0.81
940707	0802	1.24	0.093	10.7	46	66	0.71	1.85	3.77	42	0.77
940707	1102	1.18	0.093	10.7	46	66	0.73	2.11	3.74	39	0.73
940707	1402	1.18	0.093	10.7	46	64	0.74	2.27	3.89	39	0.96
940707	1702	1.07	0.103	9.7	44	71	0.81	1.64	2.86	58	1.01
940707	2002	1.07	0.103	9.7	58	74	0.82	1.58	2.88	58	0.98
940708	0202	1.23	0.103	9.7	50	69	0.73	1.69	3.31	42	0.80

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940708	0459	1.24	0.103	9.7	50	67	0.76	1.61	3.25	47	0.68
940708	0826	1.08	0.103	9.7	60	76	0.82	1.18	2.60	71	1.03
940708	1102	1.18	0.103	9.7	48	78	0.87	1.14	2.25	91	1.44
940708	1405	1.07	0.103	9.7	46	78	0.89	1.07	2.14	100	1.62
940708	1702	1.07	0.064	15.6	44	81	0.89	1.05	2.11	101	1.25
940708	2002	0.99	0.064	15.6	48	96	0.93	0.31	1.54	106	0.80
940709	0202	0.88	0.064	15.6	44	101	0.93	0.14	1.69	101	0.24
940709	0759	1.03	0.064	15.6	44	98	0.95	0.26	1.51	109	0.67
940709	1102	0.96	0.064	15.6	46	98	0.95	0.31	1.63	104	0.65
940709	1402	1.00	0.064	15.6	42	93	0.96	0.47	1.53	111	0.99
940709	1702	1.14	0.103	9.7	38	77	0.97	1.15	1.89	116	1.70
940709	2002	1.08	0.064	15.6	52	86	0.91	0.83	1.91	97	1.46
940710	0202	0.93	0.064	15.6	154	102	0.96	0.20	1.54	106	0.40
940710	1059	1.01	0.074	13.6	48	83	0.95	1.02	1.97	106	1.31
940710	1359	1.04	0.074	13.6	40	82	0.97	1.01	1.90	110	1.28
940711	0502	0.94	0.113	8.9	40	66	0.86	2.27	3.03	66	1.46
940711	0802	0.98	0.113	8.9	40	64	0.89	2.35	2.94	74	1.64
940711	1103	1.00	0.113	8.9	42	62	0.87	2.47	3.12	59	1.35
940711	1703	1.06	0.113	8.9	40	66	0.84	2.26	3.19	50	0.58
940711	2002	0.99	0.113	8.9	52	67	0.85	2.51	3.33	43	0.72
940712	0202	0.96	0.113	8.9	48	68	0.86	2.07	3.00	51	0.76
940712	0502	1.03	0.113	8.9	40	65	0.86	2.24	3.01	55	0.93
940712	0806	1.12	0.113	8.9	38	60	0.76	2.57	3.85	40	0.64
940712	1103	1.22	0.113	8.9	42	60	0.76	2.61	3.93	38	0.55
940712	1402	1.27	0.113	8.9	42	60	0.79	2.60	3.77	39	0.83
940712	2002	1.29	0.113	8.9	40	59	0.79	2.55	3.67	42	0.89
940713	0503	1.32	0.113	8.9	42	62	0.78	2.36	3.58	41	0.72
940713	0802	1.34	0.103	9.7	42	63	0.77	2.21	3.51	48	1.20
940713	1102	1.41	0.103	9.7	42	61	0.74	2.23	3.73	44	1.14
940713	1402	1.41	0.103	9.7	42	62	0.78	2.38	3.65	41	1.05
940713	1702	1.57	0.103	9.7	44	59	0.66	2.35	4.74	37	0.80
940713	2002	1.41	0.103	9.7	48	62	0.72	2.18	4.03	38	0.66
940714	0200	1.26	0.103	9.7	48	66	0.73	2.13	3.74	37	0.79
940714	0816	1.53	0.113	8.9	42	60	0.65	2.23	4.61	40	1.06
940714	1101	1.40	0.123	8.2	44	66	0.72	1.89	3.78	45	0.50
940714	1404	1.58	0.103	9.7	48	65	0.69	2.18	4.18	36	0.55
940714	1702	1.70	0.103	9.7	42	61	0.68	2.31	4.47	39	1.16
940714	2002	1.66	0.103	9.7	44	60	0.71	2.82	4.52	36	1.08
940715	0202	1.50	0.103	9.7	48	66	0.74	2.42	3.85	37	1.08
940715	0502	1.53	0.103	9.7	46	68	0.72	1.94	3.69	40	0.61
940715	0802	1.44	0.103	9.7	42	67	0.77	2.14	3.48	45	0.86
940715	1059	1.61	0.103	9.7	42	59	0.70	2.69	4.34	36	1.24
940715	1758	2.03	0.093	10.7	42	53	0.62	3.13	5.73	23	0.92
940715	1959	1.90	0.093	10.7	42	55	0.66	2.89	5.10	29	1.00
940716	0202	1.80	0.093	10.7	42	56	0.67	3.19	4.99	24	1.09
940716	0802	1.54	0.093	10.7	40	61	0.74	2.46	3.87	40	1.38
940716	1105	1.54	0.103	9.7	40	61	0.76	2.33	3.75	41	1.17
940716	1355	1.51	0.103	9.7	40	60	0.75	2.46	3.81	44	1.47
940716	1659	1.34	0.103	9.7	42	70	0.83	1.65	2.78	70	1.44
940716	2006	1.36	0.103	9.7	40	67	0.84	1.77	2.86	60	1.20
940717	1359	1.18	0.093	10.7	40	71	0.87	1.43	2.41	90	1.79

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940717	1702	1.07	0.103	9.7	40	83	0.94	0.82	1.84	108	1.09
940718	0202	1.08	0.103	9.7	42	84	0.91	0.97	2.05	101	0.97
940718	0502	1.08	0.113	8.9	38	80	0.90	1.03	2.08	101	0.96
940718	0802	1.07	0.113	8.9	38	83	0.89	0.81	1.99	100	0.66
940718	1059	1.01	0.113	8.9	38	76	0.90	1.11	2.14	98	1.19
940718	1358	1.00	0.113	8.9	38	76	0.92	1.12	2.10	103	1.07
940718	1702	0.98	0.113	8.9	34	85	0.97	0.68	1.67	116	0.85
940718	2002	1.00	0.113	8.9	38	89	0.98	0.63	1.64	116	0.92
940719	0201	0.90	0.064	15.6	36	103	0.95	0.13	1.53	109	0.37
940719	0502	0.96	0.064	15.6	44	92	0.93	0.55	1.68	105	0.91
940719	0754	0.96	0.064	15.6	180	111	0.96	-0.08	1.46	109	-0.27
940719	1102	0.97	0.064	15.6	36	99	0.99	0.37	1.53	116	0.81
940719	1659	0.95	0.064	15.6	180	124	0.99	-0.52	1.51	119	-1.02
940720	0203	0.87	0.074	13.6	-174	116	0.95	-0.04	1.53	111	-0.28
940720	0502	0.86	0.074	13.6	62	118	0.94	-0.15	1.59	104	-0.70
940720	0755	0.96	0.083	12.0	56	106	0.91	0.17	1.62	98	0.28
940720	1100	1.02	0.074	13.6	48	96	0.95	0.54	1.69	106	0.88
940720	1659	1.33	0.083	12.0	56	79	0.78	1.48	2.76	76	1.69
940720	2001	1.34	0.083	12.0	62	74	0.71	1.67	3.52	36	0.53
940721	0501	1.30	0.083	12.0	52	74	0.76	1.78	3.18	49	1.03
940721	0802	1.27	0.083	12.0	54	77	0.78	1.61	2.83	69	1.66
940721	1101	1.34	0.083	12.0	52	79	0.78	1.35	2.72	72	1.30
940721	1403	1.30	0.083	12.0	50	80	0.74	1.11	2.82	55	0.40
940721	1702	1.28	0.083	12.0	52	82	0.77	1.01	2.52	76	1.01
940721	2002	1.28	0.083	12.0	52	82	0.80	1.22	2.46	83	1.36
940722	0202	1.22	0.083	12.0	50	83	0.84	1.18	2.26	90	1.56
940722	0502	1.26	0.083	12.0	54	78	0.76	1.59	2.98	57	1.03
940722	1101	1.18	0.083	12.0	50	86	0.83	1.04	2.21	89	1.22
940722	1358	1.22	0.083	12.0	52	78	0.83	1.57	2.67	77	1.50
940722	1702	1.25	0.083	12.0	48	82	0.86	1.21	2.26	92	1.36
940722	2002	1.20	0.083	12.0	50	75	0.80	1.74	2.92	63	1.45
940723	0202	1.29	0.093	10.7	52	85	0.75	1.19	2.84	57	0.55
940723	0502	1.31	0.093	10.7	52	88	0.79	0.95	2.38	76	0.61
940723	0802	1.27	0.093	10.7	52	91	0.87	0.90	2.04	99	1.09
940723	1102	1.20	0.093	10.7	54	86	0.82	1.07	2.36	84	1.10
940723	1402	1.23	0.093	10.7	48	88	0.86	0.87	2.08	94	0.78
940723	1659	1.24	0.093	10.7	44	86	0.84	0.74	2.13	89	0.49
940723	2002	1.21	0.093	10.7	56	98	0.89	0.55	1.74	103	1.10
940724	0202	1.16	0.093	10.7	54	100	0.88	0.42	1.70	99	0.89
940724	0502	1.16	0.074	13.6	168	103	0.96	0.24	1.48	113	0.76
940724	0802	1.01	0.093	10.7	52	92	0.92	0.73	1.90	102	0.92
940724	1101	1.04	0.074	13.6	156	101	0.92	0.30	1.68	101	0.70
940724	1402	1.04	0.074	13.6	40	97	0.95	0.36	1.58	110	0.71
940724	1701	1.04	0.074	13.6	56	89	0.96	0.69	1.79	110	1.03
940724	2001	1.18	0.162	6.2	58	73	0.89	1.29	2.39	84	1.02
940725	0159	1.15	0.162	6.2	54	66	0.89	1.66	2.65	75	0.79
940725	0502	1.17	0.162	6.2	50	68	0.90	1.52	2.43	94	1.41
940725	0801	1.18	0.162	6.2	54	78	0.93	1.11	1.98	108	1.58
940725	1059	1.14	0.162	6.2	56	65	0.84	1.90	2.99	60	0.65
940725	1402	1.18	0.152	6.6	52	62	0.86	2.01	2.88	67	0.96
940725	1701	1.13	0.162	6.2	32	60	0.86	1.81	2.84	70	1.00
940725	1959	1.12	0.162	6.2	22	58	0.87	1.85	2.90	68	0.75

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940726	0202	0.90	0.162	6.2	50	72	0.89	1.36	2.40	88	1.30
940726	0502	0.88	0.162	6.2	54	73	0.90	1.25	2.26	94	1.30
940726	0827	0.86	0.162	6.2	44	81	0.95	1.01	1.94	107	1.35
940726	1102	0.84	0.162	6.2	50	77	0.90	1.27	2.24	98	1.55
940726	1402	1.07	0.162	6.2	28	61	0.81	1.90	3.15	59	0.83
940726	1702	1.35	0.152	6.6	26	55	0.77	2.06	3.56	49	0.54
940726	2002	1.70	0.142	7.0	26	43	0.62	2.39	5.65	30	0.15
940727	0205	1.73	0.132	7.6	44	49	0.57	2.75	6.70	23	0.20
940727	0505	1.81	0.123	8.2	42	47	0.58	2.92	6.40	22	0.19
940727	0802	1.87	0.132	7.6	44	48	0.60	2.38	5.59	27	0.08
940727	1101	1.86	0.132	7.6	44	46	0.59	2.55	6.20	28	0.10
940727	1405	1.72	0.123	8.2	46	53	0.63	2.50	5.50	29	0.36
940727	1659	1.88	0.132	7.6	38	54	0.64	1.64	4.41	44	0.68
940727	1959	2.02	0.123	8.2	48	53	0.58	1.56	5.33	33	0.28
940728	0201	1.69	0.123	8.2	48	50	0.59	2.22	6.13	29	0.10
940728	0502	1.60	0.132	7.6	42	54	0.65	2.26	4.87	34	0.84
940728	0802	1.65	0.123	8.2	36	55	0.62	1.93	5.09	37	0.50
940728	1102	1.75	0.123	8.2	46	55	0.59	1.79	5.25	36	0.37
940728	1402	1.70	0.123	8.2	44	55	0.58	2.30	5.85	28	0.59
940728	1659	1.73	0.123	8.2	44	53	0.57	1.83	5.71	32	0.61
940728	2001	1.88	0.123	8.2	46	50	0.57	1.60	5.49	33	0.15
940729	0202	1.71	0.132	7.6	44	51	0.64	2.74	5.75	26	0.47
940729	0459	1.77	0.123	8.2	40	49	0.60	2.53	5.90	26	0.51
940729	0802	1.56	0.123	8.2	42	56	0.62	2.35	5.31	33	1.02
940729	1058	1.55	0.132	7.6	44	63	0.65	1.52	4.13	50	1.21
940729	1358	1.52	0.123	8.2	40	61	0.64	1.78	4.39	45	1.19
940729	1651	1.38	0.123	8.2	42	64	0.69	1.93	4.09	45	0.95
940729	2001	1.33	0.123	8.2	44	63	0.68	1.93	4.21	44	0.87
940730	0202	1.29	0.123	8.2	48	67	0.72	2.06	3.95	44	1.05
940730	0502	1.33	0.123	8.2	46	66	0.72	2.19	4.09	44	0.98
940730	0802	1.33	0.132	7.6	44	67	0.71	1.82	3.92	47	0.91
940730	1101	1.28	0.132	7.6	44	67	0.69	2.03	4.24	43	0.78
940730	1401	1.13	0.142	7.0	46	72	0.73	1.77	3.74	47	0.69
940730	1701	1.20	0.123	8.2	46	67	0.71	2.05	4.11	43	0.83
940731	1059	1.42	0.113	8.9	42	64	0.71	1.76	3.55	47	1.02
940731	1402	1.23	0.113	8.9	44	70	0.77	1.72	3.26	53	0.96
940731	1701	1.44	0.113	8.9	40	67	0.79	2.02	3.30	50	0.92
940731	1959	1.51	0.103	9.7	42	63	0.72	2.20	3.87	41	1.11
940801	0159	1.40	0.074	13.6	44	69	0.74	1.86	3.30	46	0.96
940801	0502	1.27	0.074	13.6	44	74	0.78	1.32	2.78	65	0.92
940801	0801	1.39	0.074	13.6	44	69	0.73	1.57	3.33	48	0.69
940801	1051	1.37	0.162	6.2	42	70	0.74	1.47	3.13	48	0.51
940801	1357	1.33	0.162	6.2	42	67	0.76	1.91	3.38	46	0.70
940801	1657	1.31	0.162	6.2	58	70	0.80	1.50	3.06	54	0.61
940801	1958	1.40	0.162	6.2	56	70	0.75	1.58	3.20	44	0.60
940802	0155	1.62	0.152	6.6	54	64	0.69	1.57	3.91	41	0.23
940802	0458	1.86	0.132	7.6	38	57	0.65	1.91	4.38	40	0.56
940802	0758	1.82	0.132	7.6	46	58	0.67	2.02	4.30	37	0.26
940802	1112	1.78	0.132	7.6	44	58	0.64	2.02	4.63	36	0.29
940802	1358	1.83	0.132	7.6	44	59	0.66	2.04	4.40	37	0.42
940802	1658	1.74	0.132	7.6	40	57	0.72	2.08	3.87	42	0.61
940802	1958	1.63	0.142	7.0	24	56	0.74	1.99	3.68	44	0.19

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940803	0155	1.62	0.142	7.0	26	55	0.71	1.94	3.80	44	0.15
940803	0458	1.68	0.132	7.6	42	56	0.71	2.13	3.88	39	0.42
940803	0758	1.77	0.132	7.6	34	57	0.71	2.23	3.95	41	0.46
940803	1058	2.00	0.132	7.6	34	57	0.62	1.63	4.47	43	0.25
940803	1355	1.95	0.132	7.6	34	57	0.62	1.63	4.50	42	0.33
940803	1655	1.81	0.132	7.6	38	58	0.66	1.95	4.31	37	0.21
940803	1959	1.81	0.132	7.6	62	55	0.63	1.79	4.76	35	-0.10
940804	0200	1.75	0.132	7.6	48	58	0.62	2.43	5.07	29	0.24
940804	0500	1.83	0.123	8.2	54	57	0.60	2.13	5.16	31	0.08
940804	0800	1.80	0.132	7.6	44	57	0.65	2.56	4.81	31	0.48
940804	1059	1.87	0.132	7.6	54	56	0.60	2.36	5.47	27	0.05
940804	1358	2.12	0.132	7.6	48	53	0.58	2.57	5.89	27	0.11
940804	1659	2.10	0.132	7.6	46	52	0.53	2.18	6.53	26	0.24
940804	1959	2.13	0.123	8.2	42	49	0.53	2.26	6.88	26	0.06
940805	0156	1.88	0.123	8.2	48	53	0.52	2.41	7.09	25	0.24
940805	0459	1.87	0.123	8.2	44	54	0.53	2.65	7.18	25	0.52
940805	0801	1.79	0.123	8.2	42	54	0.53	2.85	7.59	25	0.55
940805	1058	1.81	0.123	8.2	46	55	0.55	3.01	7.07	23	0.37
940805	1359	1.74	0.132	7.6	42	53	0.55	2.84	6.91	24	0.59
940805	1708	1.90	0.123	8.2	42	50	0.51	2.54	7.67	24	0.33
940805	1958	1.94	0.123	8.2	44	50	0.49	2.15	7.91	26	0.12
940806	0200	1.64	0.123	8.2	48	52	0.58	2.34	6.20	28	0.15
940806	0500	1.56	0.123	8.2	44	55	0.63	2.90	5.77	31	0.45
940806	0759	1.64	0.113	8.9	42	55	0.60	3.14	6.39	28	0.46
940806	1059	1.59	0.123	8.2	48	57	0.58	3.08	6.62	26	0.39
940806	1357	1.59	0.113	8.9	44	57	0.64	3.50	6.17	26	0.84
940806	1659	1.61	0.103	9.7	48	58	0.62	3.31	6.23	25	0.45
940806	1959	1.61	0.103	9.7	48	58	0.65	3.02	5.74	28	0.35
940807	0159	1.72	0.113	8.9	50	63	0.66	2.69	5.18	34	0.42
940807	0500	1.70	0.113	8.9	54	65	0.65	2.99	5.35	28	0.41
940807	0800	1.60	0.113	8.9	48	63	0.68	3.01	5.05	31	0.67
940807	1059	1.60	0.113	8.9	50	64	0.65	3.01	5.51	28	0.66
940807	1359	1.61	0.113	8.9	50	62	0.65	3.17	5.64	28	0.67
940807	1659	1.66	0.113	8.9	40	56	0.63	2.61	5.50	33	0.70
940807	1958	1.55	0.113	8.9	46	60	0.67	2.84	5.08	32	0.63
940808	0456	1.56	0.123	8.2	46	62	0.68	2.52	4.83	37	0.48
940808	0755	1.61	0.123	8.2	46	61	0.70	2.98	4.81	33	0.41
940808	1101	1.40	0.123	8.2	54	67	0.73	2.49	4.12	31	0.28
940808	2005	1.78	0.113	8.9	40	57	0.62	2.38	5.48	36	0.64
940809	0205	1.72	0.113	8.9	54	65	0.67	2.16	4.62	36	0.27
940809	0502	1.64	0.123	8.2	42	61	0.66	2.23	4.76	37	0.21
940809	1110	1.60	0.123	8.2	64	62	0.68	1.97	4.64	36	-0.01
940809	1406	1.54	0.123	8.2	56	62	0.65	2.09	4.88	35	0.15
940809	1718	1.44	0.132	7.6	56	61	0.63	2.18	5.02	34	0.15
940809	2003	1.34	0.132	7.6	56	62	0.67	2.33	4.63	36	0.24
940810	0206	1.13	0.142	7.0	72	70	0.79	1.50	3.15	48	-0.14
940810	0506	1.13	0.142	7.0	32	69	0.79	1.72	3.10	49	0.22
940810	0806	1.15	0.152	6.6	28	61	0.76	1.76	3.50	52	0.11
940810	1107	1.17	0.142	7.0	52	64	0.77	2.33	3.70	41	0.34
940810	1702	1.07	0.152	6.6	54	73	0.84	2.12	3.08	52	0.75
940810	2005	1.28	0.142	7.0	50	62	0.70	3.03	4.73	31	0.53
940811	0505	1.12	0.152	6.6	50	59	0.80	2.59	3.71	39	0.44

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_o deg	σ	γ	δ	$\Delta\theta$ deg	A
940811	0805	1.26	0.152	6.6	52	60	0.80	2.62	3.65	40	0.40
940811	1106	1.43	0.142	7.0	56	58	0.74	2.62	4.24	35	0.04
940811	1406	1.62	0.132	7.6	48	54	0.65	3.06	5.72	25	0.12
940811	2000	1.58	0.132	7.6	54	54	0.65	2.67	5.26	29	0.06
940812	1118	1.70	0.132	7.6	52	60	0.64	2.63	5.43	29	0.17
940812	1401	1.47	0.132	7.6	54	72	0.77	2.50	3.76	33	0.44
940812	2006	1.57	0.132	7.6	68	68	0.66	2.03	4.56	31	0.00
940813	0500	1.74	0.132	7.6	54	60	0.66	1.91	4.89	34	0.10
940813	0803	1.51	0.132	7.6	46	58	0.69	2.71	4.79	29	0.38
940813	1106	1.37	0.132	7.6	56	65	0.81	2.47	3.53	34	0.32
940813	1703	1.36	0.142	7.0	52	65	0.83	2.05	3.15	44	0.40
940813	2006	1.19	0.142	7.0	56	74	0.88	1.68	2.65	87	1.33
940814	0203	1.12	0.152	6.6	56	77	0.94	1.33	2.22	101	1.75
940814	0506	1.18	0.152	6.6	58	71	0.94	1.67	2.41	104	1.43
940814	0806	1.37	0.142	7.0	54	64	0.83	2.71	3.46	42	0.53
940814	1406	1.36	0.074	13.6	52	85	1.06	1.56	1.95	131	1.98
940814	1703	1.31	0.142	7.0	56	80	0.97	2.11	2.46	110	2.09
940815	0206	1.36	0.142	7.0	58	71	0.94	2.07	2.71	89	1.55
940815	0506	1.49	0.132	7.6	50	64	0.82	2.57	3.70	38	0.63
940815	0807	1.46	0.142	7.0	56	63	0.86	2.17	3.33	45	0.35
940815	1107	1.46	0.132	7.6	52	61	0.84	2.80	3.69	37	0.49
940815	1712	1.55	0.142	7.0	52	66	0.92	2.36	2.90	55	0.89
940815	2007	1.72	0.142	7.0	54	62	0.86	2.39	3.34	41	0.27
940816	1104	1.71	0.123	8.2	52	61	0.73	2.81	4.53	29	0.41
940816	1405	1.69	0.132	7.6	48	62	0.77	3.01	4.22	32	0.79
940816	1707	1.61	0.123	8.2	48	62	0.81	2.93	3.83	35	0.97
940816	2007	1.43	0.123	8.2	50	65	0.89	2.08	3.03	49	1.07
940817	0204	1.57	0.113	8.9	50	67	0.78	2.56	3.69	36	1.15
940817	0505	1.68	0.123	8.2	42	64	0.85	2.68	3.30	49	1.38
940817	0807	1.55	0.113	8.9	48	67	0.85	2.71	3.35	45	1.34
940817	1110	1.49	0.113	8.9	48	70	0.93	2.21	2.69	97	2.01
940817	1402	1.48	0.113	8.9	48	75	0.91	1.94	2.58	99	2.06
940817	1709	1.60	0.123	8.2	44	64	0.83	2.62	3.45	42	0.98
940818	0810	1.34	0.113	8.9	42	91	1.05	0.70	1.55	125	1.27
940818	1412	1.36	0.113	8.9	46	77	0.95	1.57	2.24	109	1.69
940819	0205	1.54	0.113	8.9	40	62	0.84	2.27	3.23	50	0.98
940819	0816	1.50	0.123	8.2	46	64	0.85	2.37	3.21	50	0.89
940819	1104	1.43	0.113	8.9	44	66	0.86	2.35	3.09	55	1.14
940819	1405	1.49	0.113	8.9	46	67	0.78	2.45	3.64	41	1.05
940819	1704	1.74	0.123	8.2	44	59	0.68	2.96	4.93	31	0.56
940819	2004	1.98	0.123	8.2	44	57	0.62	2.58	5.62	29	0.55
940820	0204	2.15	0.123	8.2	40	52	0.57	2.46	6.39	27	0.51
940820	0504	2.36	0.123	8.2	38	50	0.56	2.53	6.80	29	0.42
940820	0757	2.04	0.113	8.9	42	54	0.64	3.57	5.77	24	0.72
940820	1107	2.00	0.113	8.9	50	63	0.63	2.74	5.35	27	0.57
940820	1400	2.07	0.123	8.2	50	63	0.62	2.67	5.55	27	0.56
940820	1703	2.11	0.123	8.2	46	59	0.62	2.33	5.30	31	0.29
940820	2001	2.38	0.113	8.9	44	53	0.59	2.66	6.37	26	0.30
940821	0240	2.18	0.113	8.9	46	59	0.60	2.11	5.72	31	0.38
940821	0504	2.17	0.113	8.9	44	57	0.60	2.72	5.91	29	0.56

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940821	0804	2.09	0.123	8.2	42	58	0.66	2.82	5.18	31	0.63
940821	1401	1.69	0.123	8.2	52	72	0.71	2.31	4.22	33	0.41
940821	1701	1.66	0.123	8.2	52	70	0.73	2.40	3.98	33	0.40
940821	2004	1.89	0.123	8.2	64	66	0.66	2.55	4.80	28	-0.02
940822	0204	1.47	0.132	7.6	56	77	0.83	1.48	2.81	59	0.83
940822	0501	1.70	0.132	7.6	52	66	0.79	2.08	3.55	41	0.43
940822	0804	1.60	0.132	7.6	50	70	0.83	1.83	2.99	53	0.72
940822	1101	1.48	0.132	7.6	50	73	0.81	1.92	3.27	46	0.48
940822	1403	1.29	0.132	7.6	52	87	0.92	1.18	2.16	104	1.38
940822	1703	1.26	0.132	7.6	52	90	0.97	0.85	1.81	112	1.27
940822	1959	1.33	0.142	7.0	62	80	0.91	1.31	2.17	107	1.41
940823	0802	1.14	0.054	18.5	62	96	1.01	0.52	1.60	115	1.24
940823	1057	1.19	0.054	18.5	180	101	1.03	0.28	1.46	119	0.93
940823	1655	1.27	0.132	7.6	56	91	0.96	0.84	1.79	110	1.21
940823	2000	1.24	0.064	15.6	44	93	0.99	0.64	1.61	118	1.14
940824	0201	1.15	0.162	6.2	56	82	0.94	1.12	2.12	106	1.43
940824	0501	1.26	0.162	6.2	50	76	0.88	1.51	2.49	90	1.37
940824	0801	1.17	0.162	6.2	56	82	0.92	1.17	2.10	107	1.35
940824	1101	1.08	0.064	15.6	62	99	0.99	0.40	1.57	113	1.07
940824	1406	1.21	0.064	15.6	48	85	0.95	0.95	1.90	113	1.26
940824	1658	1.30	0.162	6.2	56	· 69	0.88	1.49	2.72	62	0.43
940824	2000	1.47	0.162	6.2	26	61	0.81	1.85	3.21	52	0.26
940825	0200	1.54	0.152	6.6	66	67	0.72	1.99	3.98	36	0.07
940825	0500	1.45	0.142	7.0	50	67	0.74	2.09	3.80	37	0.36
940825	0800	1.45	0.132	7.6	58	64	0.75	1.86	3.66	40	0.17
940825	1058	1.40	0.142	7.0	40	61	0.79	2.12	3.52	44	0.39
940825	1702	1.35	0.113	8.9	26	65	0.82	1.59	2.88	58	0.16
940825	2001	1.28	0.113	8.9	36	63	0.83	1.79	3.05	55	0.48
940826	0201	1.17	0.064	15.6	36	82	0.91	0.87	1.99	104	0.94
940826	0501	1.18	0.162	6.2	68	73	0.81	1.54	2.93	55	0.44
940826	0803	1.29	0.152	6.6	32	66	0.80	1.67	3.07	53	0.35
940826	1102	1.29	0.162	6.2	34	65	0.85	1.80	2.82	63	0.83
940826	1410	1.17	0.162	6.2	56	77	0.93	1.15	2.11	106	1.30
940826	1700	1.25	0.162	6.2	50	76	0.88	1.31	2.36	92	1.33
940826	2000	1.14	0.162	6.2	34	82	0.95	1.05	1.93	111	1.32
940827	0203	0.94	0.064	15.6	162	117	0.96	-0.56	1.58	112	-1.24
940827	0503	0.88	0.064	15.6	150	121	0.94	-0.52	1.75	104	-1.18
940827	0803	0.86	0.064	15.6	-176	116	0.98	-0.26	1.56	112	-0.59
940827	1101	0.89	0.064	15.6	154	129	0.92	-0.74	1.92	100	-1.17
940827	1402	0.78	0.064	15.6	-180	125	0.92	-0.49	1.84	104	-0.73
940827	1702	0.78	0.064	15.6	152	126	0.92	-0.54	1.84	104	-1.01
940827	2005	0.91	0.064	15.6	-178	109	0.97	0.08	1.52	111	0.08
940827	2301	0.87	0.064	15.6	150	110	0.92	-0.02	1.61	99	-0.18
940828	0159	0.89	0.064	15.6	154	114	0.91	-0.20	1.61	100	-0.55
940828	0458	0.87	0.064	15.6	150	114	0.89	-0.16	1.73	94	-0.43
940828	0801	0.86	0.064	15.6	152	105	0.90	0.10	1.76	92	0.56
940828	1401	1.03	0.054	18.5	150	105	0.95	-0.11	1.55	104	-0.32
940829	0201	1.71	0.152	6.6	26	60	0.75	1.53	3.21	53	0.39
940829	0501	1.86	0.142	7.0	28	62	0.75	1.57	3.10	52	0.35
940829	0801	1.84	0.142	7.0	46	57	0.73	1.92	3.61	47	0.63
940829	1101	1.89	0.132	7.6	48	59	0.73	1.80	3.38	48	0.66
940829	1401	1.79	0.142	7.0	30	56	0.73	2.09	3.76	44	0.62

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
940829	2001	1.75	0.142	7.0	48	65	0.74	1.44	3.21	49	0.59
940830	0201	1.54	0.132	7.6	62	76	0.73	1.17	2.79	54	0.54
940830	0458	1.89	0.123	8.2	56	68	0.68	1.65	3.59	42	0.45
940830	0801	2.26	0.123	8.2	38	60	0.57	1.60	5.05	36	0.19
940830	1101	2.30	0.123	8.2	56	61	0.58	1.71	5.04	34	0.11
940830	1401	2.05	0.123	8.2	62	66	0.63	1.69	4.36	33	-0.01
940830	1708	1.71	0.123	8.2	68	67	0.69	1.59	3.78	38	-0.03
940830	2001	1.73	0.132	7.6	68	66	0.61	1.73	4.65	31	-0.27
940831	0201	1.51	0.123	8.2	56	68	0.63	2.12	4.66	29	0.27
940831	0459	1.65	0.123	8.2	46	62	0.62	2.45	5.00	29	0.54
940831	0800	1.65	0.123	8.2	46	61	0.62	2.47	4.92	28	0.61
940831	1059	1.57	0.113	8.9	46	62	0.65	2.61	4.69	29	0.93
940831	1958	1.68	0.113	8.9	42	58	0.63	2.63	5.22	28	0.36
940901	0158	1.31	0.113	8.9	44	62	0.69	2.39	4.32	36	0.80
940901	0457	1.30	0.123	8.2	46	68	0.77	1.82	3.14	50	0.96
940901	0752	1.37	0.142	7.0	44	61	0.71	2.71	4.25	35	1.12
940901	1059	1.40	0.123	8.2	42	61	0.76	2.42	3.71	41	0.92
940901	1358	1.30	0.132	7.6	44	64	0.75	2.07	3.64	47	1.37
940901	1651	1.32	0.064	15.6	46	67	0.78	2.06	3.22	49	1.18
940901	1956	1.25	0.064	15.6	46	67	0.80	2.04	3.31	46	0.83
940902	0156	1.21	0.113	8.9	44	65	0.79	2.16	3.25	51	1.42
940902	0459	1.51	0.113	8.9	38	58	0.66	2.38	4.64	37	0.74
940902	0759	1.65	0.123	8.2	44	58	0.63	3.15	5.92	27	0.29
940902	1358	1.55	0.113	8.9	50	63	0.64	2.58	5.06	29	0.68
940902	1703	1.72	0.123	8.2	46	59	0.60	2.62	5.69	30	0.73
940903	0153	2.10	0.123	8.2	40	56	0.50	2.21	7.24	30	0.33
940903	0456	1.77	0.123	8.2	42	59	0.59	2.34	5.74	34	0.55
940903	0759	1.72	0.123	8.2	48	62	0.57	1.99	5.85	31	0.33
940903	1059	1.66	0.132	7.6	44	59	0.60	2.12	5.49	33	0.52
940903	1359	1.58	0.132	7.6	48	61	0.62	1.98	5.28	34	0.42
940903	1653	1.51	0.142	7.0	46	57	0.65	2.04	5.10	36	0.49
940903	1959	1.60	0.142	7.0	48	59	0.66	2.32	5.14	30	0.02
940904	0151	1.44	0.132	7.6	52	66	0.68	2.40	4.78	29	0.17
940904	0759	1.50	0.132	7.6	56	72	0.66	2.56	4.80	27	0.26
940904	1359	1.55	0.132	7.6	54	69	0.65	2.41	4.82	27	0.16
940904	1659	1.58	0.132	7.6	56	68	0.62	2.84	5.52	24	0.45
940905	0157	1.43	0.093	10.7	54	71	0.73	2.19	3.89	32	0.33
940905	0459	1.50	0.103	9.7	54	69	0.73	2.25	4.01	34	0.41
940905	0759	1.50	0.093	10.7	64	71	0.72	2.23	3.96	31	0.28
940905	1100	1.52	0.093	10.7	54	72	0.74	2.15	3.74	34	0.44
940905	1659	1.75	0.093	10.7	54	66	0.61	2.62	5.44	26	0.44
940905	1959	1.56	0.093	10.7	52	69	0.70	2.04	4.01	34	0.34
940906	0459	1.57	0.103	9.7	66	70	0.72	1.74	3.66	38	0.02
940906	0759	1.56	0.103	9.7	64	72	0.76	1.68	3.22	43	0.29
940906	1547	1.34	0.113	8.9	34	70	0.80	1.66	3.03	52	0.34
940906	1730	1.30	0.103	9.7	64	78	0.83	1.31	2.67	63	0.59
940906	1959	1.22	0.103	9.7	68	86	0.91	0.97	2.05	100	1.11
940907	0151	1.14	0.113	8.9	70	91	0.93	0.82	1.87	100	1.35
940907	0459	1.06	0.054	18.5	70	105	0.92	0.41	1.64	100	1.30
940907	0800	1.08	0.064	15.6	68	105	0.93	0.42	1.59	103	1.27
940907	1356	1.07	0.074	13.6	54	107	0.99	0.30	1.51	112	0.78

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940907	1710	1.09	0.074	13.6	62	105	0.97	0.47	1.59	114	1.02
940907	1959	1.07	0.074	13.6	68	110	0.95	0.25	1.52	108	0.82
940908	0159	1.24	0.083	12.0	54	86	0.93	1.23	2.00	104	1.98
940908	0459	1.35	0.083	12.0	52	90	0.94	0.97	1.83	107	1.52
940908	0756	1.39	0.093	10.7	52	81	0.86	1.68	2.61	87	1.47
940908	1116	1.23	0.093	10.7	60	95	0.95	1.03	1.90	109	1.67
940908	1359	1.29	0.093	10.7	56	85	0.92	1.52	2.20	106	2.04
940908	1659	1.20	0.064	15.6	58	90	0.90	1.26	2.15	97	1.69
940908	1957	1.16	0.093	10.7	58	91	0.90	1.14	2.10	98	1.54
940909	0159	1.20	0.093	10.7	58	86	0.89	1.13	2.21	96	1.45
940909	0459	1.30	0.162	6.2	50	73	0.84	1.56	2.66	68	1.44
940909	0757	1.27	0.162	6.2	50	71	0.83	2.02	2.99	53	1.15
940909	1059	1.33	0.162	6.2	52	70	0.77	2.26	3.55	38	0.81
940909	1400	1.42	0.152	6.6	50	74	0.78	1.46	3.11	56	0.93
940909	1700	1.72	0.142	7.0	50	63	0.64	1.53	4.16	40	0.58
940909	2000	1.95	0.142	7.0	44	57	0.58	1.59	5.21	34	0.31
940909	2257	1.74	0.142	7.0	52	60	0.65	1.73	4.60	36	0.32
940910	0158	1.96	0.132	7.6	48	58	0.64	1.58	4.58	35	0.59
940910	0458	2.10	0.132	7.6	50	58	0.56	1.44	5.26	31	0.60
940910	0800	2.07	0.132	7.6	50	56	0.55	1.62	5.54	31	0.29
940910	1101	1.98	0.132	7.6	50	56	0.53	1.97	6.38	26	0.37
940910	1400	2.07	0.132	7.6	52	60	0.53	1.81	6.47	26	0.45
940910	1657	2.42	0.132	7.6	56	61	0.52	1.41	6.12	29	0.35
940910	1956	2.25	0.142	7.0	54	60	0.57	1.03	4.42	40	0.46
940910	2300	2.06	0.132	7.6	58	61	0.57	1.49	5.35	31	0.25
940911	0157	2.07	0.132	7.6	50	63	0.56	1.43	5.06	36	0.72
940911	0459	1.94	0.123	8.2	54	64	0.53	1.13	5.73	34	0.47
940911	0800	1.67	0.142	7.0	50	64	0.58	1.30	5.04	40	0.88
940911	1058	1.55	0.142	7.0	50	69	0.58	1.29	4.96	41	0.60
940911	1400	1.40	0.142	7.0	56	75	0.59	1.33	5.22	38	0.12
940911	2000	1.28	0.162	6.2	98	76	0.65	0.85	3.74	47	0.11
940911	2257	1.32	0.152	6.6	100	75	0.65	0.73	3.52	51	0.06
940912	0200	1.36	0.152	6.6	52	75	0.63	0.81	3.76	50	0.24
940912	0500	1.29	0.152	6.6	56	74	0.63	0.92	4.08	44	0.29
940912	0758	1.12	0.152	6.6	94	73	0.69	1.06	3.61	49	0.04
940912	1052	1.08	0.152	6.6	50	75	0.72	1.28	3.52	49	0.15
940912	1412	1.06	0.152	6.6	94	81	0.69	1.22	3.59	44	-0.23
940912	1657	1.19	0.142	7.0	94	80	0.63	1.27	4.26	37	0.01
940912	1959	1.18	0.152	6.6	98	83	0.65	0.71	3.73	41	-0.53
940912	2259	1.12	0.142	7.0	96	79	0.67	0.82	3.42	48	-0.62
940913	0200	1.13	0.132	7.6	86	79	0.69	0.81	3.20	49	-0.29
940913	0457	1.21	0.054	18.5	82	80	0.69	1.08	3.33	43	-0.28
940913	0759	1.33	0.054	18.5	88	81	0.70	0.79	3.17	47	-0.45
940913	1057	1.43	0.064	15.6	88	78	0.71	0.79	2.93	50	-0.29
940913	1413	1.57	0.064	15.6	68	78	0.68	0.86	3.19	48	0.18
940913	1659	1.44	0.064	15.6	88	78	0.66	0.97	3.69	43	-0.49
940913	1959	1.71	0.064	15.6	76	80	0.58	1.27	4.94	29	0.03
940913	2257	1.56	0.064	15.6	92	77	0.62	0.95	3.89	42	-0.26
940914	0159	1.46	0.074	13.6	90	82	0.64	0.68	3.71	42	-0.56
940914	0459	1.50	0.074	13.6	88	85	0.69	0.59	3.04	47	-0.04
940914	0758	1.47	0.074	13.6	90	78	0.68	1.04	3.64	41	-0.35
940914	1059	1.56	0.074	13.6	88	77	0.64	0.99	3.89	38	-0.08
940914	1357	1.46	0.074	13.6	86	77	0.72	1.18	3.42	43	-0.14

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_o deg	σ	γ	δ	Δθ deg	A
940914	1701	1.44	0.074	13.6	88	81	0.73	0.97	3.22	44	-0.26
940914	2000	1.44	0.074	13.6	88	86	0.73	1.09	3.21	46	0.02
940914	2300	1.28	0.083	12.0	58	78	0.73	1.47	3.48	43	0.35
940915	0200	1.20	0.083	12.0	84	85	0.76	1.25	3.04	49	0.13
940915	0757	1.26	0.083	12.0	86	82	0.72	1.26	3.31	41	-0.18
940915	1114	1.25	0.083	12.0	86	78	0.67	1.30	3.88	39	-0.22
940915	1402	1.15	0.162	6.2	56	78	0.74	1.60	3.43	43	0.17
940915	1657	1.04	0.093	10.7	84	87	0.80	1.38	2.83	60	0.65
940915	1951	0.94	0.074	13.6	84	94	0.84	0.92	2.41	82	0.95
940915	2300	0.89	0.093	10.7	84	94	0.80	0.82	2.50	76	0.96
940916	0157	0.99	0.074	13.6	60	87	0.82	1.24	2.58	76	1.14
940916	0500	0.99	0.083	12.0	56	85	0.83	1.06	2.55	75	1.11
940916	0757	1.04	0.083	12.0	52	80	0.81	1.25	2.78	66	0.76
940916	1059	1.11	0.083	12.0	46	69	0.81	1.83	3.15	53	0.83
940916	1400	1.05	0.103	9.7	48	77	0.80	1.53	2.95	54	0.47
940916	1659	1.12	0.103	9.7	48	74	0.79	1.52	3.14	50	0.26
940916	1959	1.11	0.093	10.7	54	76	0.74	1.57	3.36	43	0.35
940916	2259	1.09	0.103	9.7	52	71	0.75	1.72	3.55	43	0.45
940917	0159	1.05	0.113	8.9	48	72	0.79	1.83	3.22	49	0.75
940917	0500	1.05	0.132	7.6	48	69	0.75	1.97	3.40	45	0.82
940917	0800	1.04	0.103	9.7	48	71	0.78	1.60	3.07	52	1.01
940917	1057	1.04	0.113	8.9	40	66	0.77	1.53	3.18	54	1.11
940917	1400	1.01	0.103	9.7	38	74	0.83	1.04	2.46	74	0.66
940917	1659	1.04	0.074	13.6	48	73	0.81	1.48	2.79	66	1.20
940917	1959	1.11	0.074	13.6	48	74	0.80	1.48	2.82	69	1.54
940917	2259	1.31	0.074	13.6	44	65	0.77	1.99	3.55	46	1.42
940918	0157	1.41	0.074	13.6	46	64	0.69	1.84	3.88	41	1.26
940918	0500	1.49	0.074	13.6	50	63	0.64	2.51	4.84	28	1.26
940918	0759	1.52	0.074	13.6	48	62	0.64	2.30	4.81	32	1.30
940918	1059	1.36	0.074	13.6	48	61	0.65	2.13	4.74	32	1.22
940918	1359	1.38	0.074	13.6	46	67	0.67	1.23	3.58	52	1.08
940918	1657	1.33	0.074	13.6	52	71	0.70	1.07	3.08	53	1.10
940918	1959	1.33	0.074	13.6	50	72	0.66	1.38	3.75	44	0.58
940919	0459	1.35	0.083	12.0	52	74	0.72	1.34	3.48	46	0.37
940919	0757	1.32	0.074	13.6	50	70	0.64	1.61	4.21	40	0.71
940919	1134	1.34	0.083	12.0	48	67	0.62	1.50	4.56	41	0.83
940919	1400	1.32	0.083	12.0	44	68	0.70	1.08	3.29	53	0.79
940919	1659	1.47	0.083	12.0	90	67	0.64	0.77	3.66	48	0.04
940919	2257	1.56	0.083	12.0	48	63	0.58	1.43	5.13	38	0.64
940920	0200	1.53	0.103	9.7	42	64	0.62	1.08	4.07	48	0.66
940920	0458	1.54	0.103	9.7	44	60	0.59	1.62	4.85	42	0.91
940920	0800	1.53	0.103	9.7	42	58	0.60	2.03	5.46	36	0.67
940920	1659	1.43	0.103	9.7	44	59	0.64	2.11	5.15	38	0.94
940920	2259	1.48	0.093	10.7	52	65	0.63	2.49	5.32	30	0.46
940921	0159	1.52	0.103	9.7	42	59	0.61	1.98	5.44	37	0.58
940921	0847	1.52	0.093	10.7	48	62	0.62	2.34	5.52	34	0.64
940921	1115	1.53	0.093	10.7	46	61	0.65	2.25	5.08	37	0.92
940921	1400	1.48	0.093	10.7	44	60	0.64	1.98	4.96	40	0.89
940921	1646	1.39	0.093	10.7	50	63	0.66	2.50	5.05	34	0.90
940921	2000	1.24	0.093	10.7	46	62	0.74	2.31	4.08	42	0.98
940921	2300	1.38	0.093	10.7	42	64	0.74	1.79	3.63	51	1.04
940922	0200	1.33	0.093	10.7	42	66	0.75	1.77	3.48	50	1.19

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
940922	0500	1.30	0.093	10.7	44	72	0.71	1.62	3.64	45	0.18
940922	0800	1.25	0.093	10.7	44	74	0.77	1.44	3.00	53	0.41
940923	1028	1.14	0.074	13.6	40	90	0.87	0.53	2.00	92	0.46
940923	1401	1.06	0.074	13.6	38	98	0.90	0.32	2.02	92	0.27
940923	1700	1.06	0.074	13.6	78	98	0.83	0.49	2.04	79	0.88
940923	2000	1.09	0.074	13.6	58	94	0.87	0.64	1.87	91	1.02
940924	2000	1.07	0.074	13.6	50	90	0.87	0.74	2.06	90	0.75
940925	0500	1.02	0.083	12.0	76	99	0.89	0.39	1.80	94	0.71
940925	0800	1.06	0.083	12.0	48	93	0.90	0.68	1.79	102	0.94
940925	1058	1.00	0.083	12.0	60	90	0.84	0.82	2.10	87	1.15
940925	1700	1.04	0.083	12.0	46	97	0.91	0.47	1.76	101	0.56
940925	2000	0.98	0.083	12.0	52	96	0.88	0.68	1.96	93	0.81
940925	2300	0.92	0.083	12.0	52	97	0.87	0.52	1.93	91	0.60
940926	0200	0.85	0.083	12.0	60	103	0.89	0.53	1.99	89	0.60
940926	0500	0.91	0.083	12.0	42	98	0.89	0.42	1.94	92	0.30
940926	0800	0.97	0.054	18.5	64	87	0.80	1.08	2.69	67	1.09
940926	1700	1.40	0.054	18.5	62	80	0.80	1.91	3.19	58	1.73
940926	2000	1.70	0.064	15.6	64	86	0.87	1.53	2.41	89	1.98
940926	2300	1.53	0.064	15.6	56	78	0.84	2.54	3.14	61	2.17
940927	0200	1.63	0.064	15.6	60	83	0.88	1.90	2.63	83	2.62
940927	0500	1.53	0.064	15.6	58	95	1.01	1.11	1.78	125	2.17
940927	0800	1.69	0.074	13.6	54	84	0.95	1.70	2.25	113	2.30
940927	1100	1.75	0.074	13.6	54	92	1.03	1.09	1.81	130	1.51
940927	1401	1.82	0.074	13.6	54	76	0.88	2.35	2.97	69	1.84
940927	1701	1.88	0.074	13.6	48	92	0.99	0.99	1.95	114	1.16
940927	2300	1.64	0.083	12.0	48	78	0.89	1.57	2.58	85	1.25
940928	0200	1.46	0.083	12.0	50	78	0.91	1.87	2.59	88	1.71
940928	0500	1.47	0.083	12.0	48	76	0.85	1.76	2.90	64	0.99
940928	1055	1.40	0.093	10.7	48	72	0.85	2.15	2.99	60	1.33
940928	1400	1.22	0.093	10.7	46	74	0.85	1.76	2.76	68	1.27
940928	1700	1.10	0.093	10.7	48	87	0.93	0.99	1.99	105	1.14
940928	1957	1.11	0.093	10.7	46	77	0.89	1.54	2.45	88	1.31
940929	0200	0.98	0.093	10.7	48	86	0.88	1.19	2.28	91	1.00
940929	0500	0.94	0.093	10.7	46	80	0.85	1.25	2.51	75	0.89
940929	0757	0.95	0.093	10.7	48	78	0.82	1.36	2.64	65	0.84
940929	1100	0.88	0.103	9.7	42	81	0.84	0.97	2.40	76	0.36
940929	1357	0.81	0.093	10.7	48	88	0.91	0.78	2.04	97	0.62
940929	1700	0.78	0.093	10.7	44	94	0.91	0.52	1.97	95	0.27
940929	2000	0.78	0.064	15.6	46	98	0.92	0.47	1.87	101	0.38
940930	0200	0.76	0.064	15.6	50	105	0.91	0.36	1.85	99	0.46
940930	0500	0.82	0.162	6.2	54	93	0.87	0.66	2.09	87	0.48
940930	0800	0.94	0.162	6.2	50	79	0.85	1.30	2.48	74	1.20
940930	1400	1.04	0.162	6.2	40	69	0.90	1.43	2.46	82	1.14
940930	1700	0.96	0.162	6.2	54	73	0.88	1.14	2.42	77	0.79
940930	1954	1.10	0.162	6.2	42	57	0.82	2.30	3.45	55	1.22
941001	0159	0.90	0.152	6.6	48	76	0.84	1.56	2.69	68	1.33
941001	0459	0.86	0.152	6.6	48	75	0.87	1.38	2.55	74	1.24
941001	1059	0.89	0.142	7.0	40	71	0.94	1.54	2.32	99	1.73
941001	1358	0.91	0.152	6.6	42	72	0.93	1.63	2.36	100	1.70
941001	1659	0.90	0.152	6.6	34	70	0.95	1.65	2.34	104	1.66
941001	1959	0.81	0.064	15.6	42	87	0.99	0.89	1.80	115	1.11

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
941002	0159	0.87	0.123	8.2	46	71	0.87	2.01	2.74	77	2.05
941002	0459	0.81	0.132	7.6	44	83	1.00	1.27	1.93	118	2.04
941002	0756	0.75	0.064	15.6	46	101	1.00	0.42	1.56	120	0.46
941002	1359	0.81	0.064	15.6	46	98	1.02	0.59	1.61	125	0.64
941002	1658	0.79	0.074	13.6	48	97	1.01	0.59	1.60	116	0.79
941002	1956	0.87	0.074	13.6	52	96	1.01	0.69	1.57	120	1.62
941003	0759	1.05	0.113	8.9	46	69	0.89	2.37	2.90	71	2.09
941003	1104	1.10	0.113	8.9	44	66	0.83	2.19	3.08	62	2.03
941003	1345	1.22	0.113	8.9	40	59	0.79	2.27	3.52	52	1.24
941003	1659	1.09	0.113	8.9	44	63	0.86	2.26	3.17	62	1.63
941003	1956	1.18	0.103	9.7	46	70	0.87	1.92	2.81	68	1.61
941003	2258	1.34	0.093	10.7	44	63	0.78	2.52	3.84	45	1.76
941004	0159	1.36	0.093	10.7	44	63	0.72	2.31	4.02	41	1.37
941004	0459	1.15	0.093	10.7	48	67	0.78	2.01	3.51	51	1.54
941004	0803	1.17	0.103	9.7	48	72	0.79	1.73	3.24	56	1.26
941004	0951	1.24	0.103	9.7	50	72	0.74	1.84	3.64	46	1.19
941004	1151	1.21	0.103	9.7	48	75	0.74	1.70	3.58	49	0.75
941004	1319	1.25	0.103	9.7	48	75	0.75	1.69	3.40	52	0.89
941006	1520	1.34	0.083	12.0	54	79	0.68	0.78	3.34	50	-0.03
941006	1723	1.53	0.162	6.2	56	70	0.63	0.65	3.66	46	0.30
941006	2123	1.74	0.083	12.0	58	71	0.59	0.42	3.66	45	0.39
941006	2323	1.81	0.083	12.0	58	74	0.55	0.34	4.13	41	0.15
941007	0123	1.82	0.083	12.0	58	73	0.55	0.50	4.52	39	0.23
941007	0323	1.85	0.132	7.6	54	70	0.56	0.65	4.36	42	0.36
941007	0523	1.77	0.083	12.0	54	66	0.55	0.85	4.85	39	0.60
941007	0723	1.64	0.093	10.7	54	64	0.57	0.97	4.70	38	0.66
941007	0920	1.53	0.103	9.7	52	64	0.60	1.12	4.42	40	1.02
941007	1123	1.66	0.093	10.7	52	62	0.58	1.30	4.99	34	1.02
941007	1323	1.65	0.093	10.7	46	58	0.58	1.61	5.34	32	0.95
941007	1523	1.64	0.103	9.7	42	56	0.59	1.41	4.43	38	0.99
941007	1723	1.74	0.103	9.7	42	55	0.57	1.32	4.53	39	0.81
941007	1923	1.74	0.103	9.7	48	59	0.56	1.02	4.23	43	0.79
941007	2120	1.53	0.103	9.7	50	62	0.59	1.11	4.49	40	0.96
941007	2323	1.43	0.103	9.7	48	63	0.61	1.00	4.05	43	0.83
941008	0123	1.36	0.103	9.7	50	61	0.58	1.22	4.72	36	0.77
941008	0723	1.23	0.113	8.9	46	59	0.62	1.84	4.70	32	0.89
941008	0923	1.20	0.103	9.7	44	53	0.58	2.37	5.81	25	0.54
941008	1123	1.21	0.103	9.7	40	53	0.59	2.39	5.67	25	0.74
941008	1325	1.26	0.113	8.9	40	53	0.60	2.29	5.41	26	0.84
941008	1523	1.25	0.113	8.9	42	56	0.62	1.94	4.81	32	0.98
941008	1723	1.18	0.123	8.2	44	56	0.63	1.72	4.41	37	0.85
941008	1923	1.09	0.113	8.9	44	56	0.66	1.75	4.16	39	0.85
941008	2119	1.02	0.113	8.9	46	57	0.69	1.64	3.84	41	0.72
941008	2323	1.01	0.113	8.9	50	61	0.70	1.63	3.62	40	0.88
941009	0123	1.00	0.074	13.6	50	64	0.69	1.52	3.56	42	1.02
941009	0323	0.96	0.074	13.6	48	63	0.67	1.80	3.96	37	1.18
941009	0523	1.02	0.074	13.6	44	63	0.71	1.76	3.54	46	1.48
941009	0723	1.09	0.074	13.6	48	64	0.72	1.85	3.47	45	1.31
941009	0920	1.17	0.074	13.6	46	62	0.74	1.83	3.39	47	1.46
941009	1123	1.23	0.074	13.6	48	61	0.68	2.23	4.07	28	1.38
941009	1754	1.20	0.074	13.6	50	65	0.74	1.58	3.21	51	1.23
941009	2123	1.15	0.074	13.6	50	70	0.79	1.36	2.83	64	1.21
941009	2323	1.13	0.074	13.6	48	70	0.78	1.40	2.84	66	1.64

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
941010	0123	1.18	0.074	13.6	50	71	0.77	1.33	2.84	68	1.68
941010	0323	1.17	0.074	13.6	48	77	0.83	0.86	2.17	86	1.84
941010	0523	1.10	0.083	12.0	44	78	0.82	0.80	2.18	86	1.44
941010	0723	1.09	0.083	12.0	46	80	0.81	0.74	2.08	85	1.50
941010	1058	1.08	0.083	12.0	50	92	0.81	0.36	1.94	85	0.41
941010	1357	1.11	0.064	15.6	144	94	0.82	0.23	1.89	88	0.47
941010	1657	1.10	0.064	15.6	48	90	0.84	0.34	1.92	90	0.49
941010	1955	1.14	0.064	15.6	52	84	0.84	0.39	2.01	85	0.68
941011	0157	1.28	0.162	6.2	52	72	0.80	0.90	2.50	71	1.11
941011	0457	1.61	0.152	6.6	48	65	0.70	1.42	3.32	44	0.71
941011	0757	1.79	0.142	7.0	56	58	0.63	1.51	4.28	38	0.07
941011	1057	1.76	0.132	7.6	52	61	0.63	1.82	4.50	31	0.52
941011	1357	1.60	0.083	12.0	52	63	0.64	1.96	4.44	28	0.78
941011	1657	1.82	0.093	10.7	54	62	0.65	1.82	4.20	30	0.41
941011	1956	2.32	0.093	10.7	48	52	0.54	1.79	5.91	27	0.08
941012	0157	2.27	0.103	9.7	50	58	0.53	1.70	5.56	27	0.46
941012	0457	2.28	0.103	9.7	52	58	0.55	1.52	5.48	30	0.32
941012	0757	2.88	0.113	8.9	56	54	0.46	1.22	6.49	27	-0.14
941012	1057	3.24	0.113	8.9	50	51	0.42	1.10	7.01	26	0.02
941012	1357	3.64	0.103	9.7	50	49	0.41	0.97	7.05	25	-0.11
941012	1657	3.46	0.113	8.9	48	47	0.44	1.02	6.60	29	-0.05
941012	1955	3.57	0.103	9.7	46	46	0.42	0.92	6.59	28	0.06
941013	0158	3.15	0.113	8.9	50	48	0.45	0.91	6.06	30	-0.15
941013	0457	2.88	0.103	9.7	48	51	0.45	1.09	6.46	27	0.25
941013	0757	2.81	0.113	8.9	48	50	0.43	1.56	8.18	23	0.07
941013	1057	2.66	0.103	9.7	44	52	0.44	1.50	6.97	26	0.36
941013	1355	2.61	0.103	9.7	48	55	0.44	1.07	6.50	28	0.40
941013	1658	3.30	0.103	9.7	50	54	0.42	0.87	6.53	26	0.22
941013	2002	3.35	0.093	10.7	48	51	0.40	1.14	7.75	21	0.22
941014	0202	3.44	0.093	10.7	50	55	0.38	1.00	8.04	22	0.22
941014	0502	3.27	0.093	10.7	48	54	0.38	1.32	8.98	20	0.45
941014	0802	3.09	0.093	10.7	48	53	0.40	1.60	10.04	19	0.46
941014	1059	2.51	0.093	10.7	50	55	0.42	1.60	8.74	20	0.36
941014	1403	2.35	0.103	9.7	52	57	0.45	1.40	7.20	24	0.39
941014	1700	2.50	0.103	9.7	52	56	0.44	0.91	6.50	27	0.23
941014	2002	3.14	0.113	8.9	50	57	0.41	0.67	5.93	27	0.32
941015	0204	4.38	0.103	9.7	52	52	0.40	0.42	4.90	29	-0.03
941015	0502	4.56	0.093	10.7	50	51	0.39	0.47	5.54	28	0.03
941015	0805	4.30	0.083	12.0	46	50	0.37	0.86	8.03	21	0.32
941015	1102	4.10	0.093	10.7	48	51	0.37	0.89	8.44	20	0.23
941015	1404	3.96	0.093	10.7	46	52	0.37	0.71	6.86	24	0.36
941015	1704	4.38	0.093	10.7	48	52	0.36	0.77	8.42	21	0.30
941015	2002	4.12	0.093	10.7	50	53	0.37	0.70	7.98	22	0.21
941016	0202	3.18	0.093	10.7	50	56	0.36	1.14	10.51	20	0.33
941016	0505	2.91	0.093	10.7	48	55	0.35	1.45	11.29	18	0.51
941016	0805	2.70	0.093	10.7	48	56	0.41	1.51	9.16	19	0.59
941016	1104	2.29	0.093	10.7	50	63	0.50	1.16	5.84	33	1.26
941016	1404	2.42	0.093	10.7	50	61	0.44	1.40	7.40	26	1.09
941016	1705	2.09	0.103	9.7	50	58	0.44	1.56	7.86	23	0.81
941016	2005	1.92	0.103	9.7	52	60	0.45	1.79	9.22	19	0.62
941017	0205	1.81	0.083	12.0	50	61	0.48	1.96	7.40	22	0.88
941017	0504	1.77	0.093	10.7	52	61	0.49	1.88	7.75	24	0.77
941017	0804	1.62	0.103	9.7	52	62	0.51	1.58	6.92	26	0.90

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_o deg	σ	γ	δ	$\Delta\theta$ deg	A
941017	1057	1.43	0.103	9.7	50	69	0.59	1.01	4.38	43	1.08
941017	1404	1.65	0.103	9.7	50	67	0.51	1.17	5.44	35	0.96
941017	1704	1.50	0.103	9.7	54	65	0.53	1.66	6.60	27	0.55
941017	2004	1.34	0.064	15.6	54	70	0.60	1.50	5.42	33	0.38
941018	0202	1.53	0.064	15.6	46	70	0.61	1.16	4.53	41	0.04
941018	0504	1.60	0.064	15.6	46	68	0.60	1.17	4.60	43	0.39
941018	0805	1.53	0.064	15.6	50	71	0.62	1.43	4.79	37	0.20
941018	1102	1.50	0.064	15.6	90	87	0.62	0.80	4.13	44	-0.09
941018	1404	1.54	0.074	13.6	64	84	0.58	1.33	5.05	36	-0.05
941018	1705	1.49	0.074	13.6	70	84	0.61	1.36	4.38	38	0.38
941018	2005	1.34	0.074	13.6	98	88	0.72	0.88	3.17	50	-0.23
941019	0203	1.56	0.074	13.6	88	82	0.60	0.95	4.24	39	-0.41
941019	0505	1.70	0.083	12.0	52	74	0.69	1.68	3.94	44	0.64
941019	0805	1.98	0.074	13.6	52	70	0.70	1.94	4.06	39	0.98
941019	1104	2.13	0.074	13.6	48	68	0.66	1.88	4.25	40	1.17
941019	1436	2.14	0.074	13.6	50	69	0.71	2.02	3.99	41	1.04
941019	1702	2.15	0.074	13.6	50	62	0.64	2.32	5.16	31	0.75
941019	1958	2.10	0.074	13.6	46	66	0.80	2.26	3.48	48	1.14
941020	0158	1.88	0.074	13.6	46	67	0.74	1.94	3.60	49	1.47
941020	0458	1.78	0.074	13.6	48	70	0.76	1.66	3.36	51	0.88
941020	0759	1.62	0.074	13.6	50	70	0.82	2.23	3.22	51	1.53
941020	1058	1.54	0.074	13.6	50	68	0.76	2.24	3.71	44	1.31
941020	1355	1.45	0.083	12.0	48	68	0.77	1.81	3.48	49	1.20
941020	1657	1.49	0.083	12.0	46	64	0.79	2.11	3.44	50	1.39
941020	2004	1.35	0.083	12.0	46	72	0.87	1.78	2.82	65	1.01
941021	0205	1.27	0.083	12.0	48	76	0.88	1.66	2.58	83	1.50
941021	0504	1.24	0.093	10.7	48	71	0.85	2.11	2.95	58	1.36
941021	0804	1.23	0.093	10.7	46	73	0.88	1.79	2.66	76	1.47
941021	1101	1.15	0.093	10.7	50	82	0.92	1.31	2.27	100	1.36
941021	1353	1.21	0.103	9.7	46	75	0.84	1.66	2.91	59	0.73
941021	1651	1.22	0.103	9.7	44	66	0.76	1.79	3.52	50	0.82
941021	1954	1.18	0.103	9.7	26	63	0.78	1.48	3.39	55	0.05
941022	0153	1.22	0.074	13.6	52	72	0.75	1.70	3.56	45	0.58
941022	0435	1.46	0.083	12.0	50	65	0.65	1.76	4.45	36	0.79
941022	0754	1.49	0.083	12.0	50	61	0.65	2.24	5.01	33	0.92
941022	1053	1.58	0.074	13.6	56	63	0.67	2.10	4.92	34	0.53
941022	1353	1.47	0.074	13.6	52	68	0.64	1.68	4.86	37	0.80
941022	1653	1.74	0.074	13.6	52	60	0.51	2.02	6.91	22	0.74
941022	1954	1.86	0.074	13.6	52	57	0.54	1.65	6.56	24	0.29
941023	0153	1.78	0.074	13.6	50	64	0.59	1.61	5.25	36	1.09
941023	0453	1.92	0.074	13.6	50	61	0.52	1.60	6.50	28	0.86
941023	0751	2.10	0.074	13.6	48	58	0.52	1.56	6.54	27	0.71
941023	1353	2.01	0.083	12.0	54	63	0.50	1.65	7.31	24	0.67
941023	1653	2.07	0.083	12.0	50	61	0.50	1.84	7.37	24	0.36
941023	1954	1.98	0.074	13.6	52	62	0.56	1.46	5.49	32	0.72
941024	0154	1.66	0.083	12.0	52	67	0.62	1.42	4.55	38	1.04
941024	0452	1.72	0.074	13.6	52	69	0.64	1.28	4.12	43	0.90
941024	0753	1.71	0.083	12.0	50	68	0.64	1.14	3.83	47	0.94
941024	1054	1.65	0.074	13.6	52	71	0.66	1.03	3.65	48	0.78
941024	1354	1.59	0.074	13.6	50	73	0.65	1.01	3.56	50	0.83
941024	1650	1.50	0.083	12.0	50	74	0.66	0.72	3.26	53	0.21
941024	1954	1.37	0.083	12.0	50	77	0.72	0.59	2.81	58	0.03
941024	2254	1.17	0.093	10.7	48	82	0.81	0.56	2.33	73	0.07

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
941025	0154	1.27	0.074	13.6	50	80	0.73	0.78	2.77	59	0.28
941025	0453	1.27	0.083	12.0	42	77	0.77	0.63	2.42	68	0.23
941025	0754	1.18	0.093	10.7	46	80	0.79	0.72	2.51	70	0.32
941025	1053	1.10	0.083	12.0	36	87	0.82	0.42	2.15	85	0.37
941025	1354	1.11	0.074	13.6	142	94	0.82	0.25	2.23	81	0.22
941025	1652	1.03	0.074	13.6	140	103	0.81	-0.08	2.27	71	0.25
941025	1953	0.97	0.074	13.6	146	104	0.83	-0.10	2.05	82	-0.01
941025	2254	1.00	0.074	13.6	146	111	0.82	-0.39	2.10	77	-0.36
941026	0154	1.06	0.064	15.6	142	101	0.85	-0.17	1.90	87	-0.12
941026	0453	1.15	0.162	6.2	144	92	0.85	0.21	1.95	89	0.33
941026	0751	1.28	0.064	15.6	142	93	0.83	0.07	1.81	90	0.13
941026	1354	1.21	0.064	15.6	142	91	0.83	0.28	2.01	88	0.39
941026	1648	1.32	0.064	15.6	48	86	0.81	0.47	2.08	87	0.51
941026	1951	1.59	0.162	6.2	40	74	0.75	0.70	2.51	60	-0.10
941026	2253	1.56	0.103	9.7	76	83	0.72	0.73	2.68	51	0.20
941027	0154	1.66	0.103	9.7	72	84	0.63	0.86	3.67	37	0.27
941027	0454	1.67	0.103	9.7	76	85	0.61	0.89	3.77	38	0.26
941027	0755	1.80	0.083	12.0	54	81	0.61	0.82	3.70	42	-0.01
941027	1052	1.96	0.083	12.0	54	77	0.63	0.94	3.42	48	0.53
941027	1353	1.87	0.083	12.0	52	79	0.61	0.69	3.58	47	0.01
941027	1653	2.06	0.083	12.0	58	76	0.60	0.84	3.86	42	0.24
941027	1953	2.08	0.083	12.0	54	73	0.59	0.56	3.76	45	0.18
941027	2253	2.11	0.093	10.7	54	73	0.59	0.58	3.72	45	0.08
941028	0154	2.27	0.083	12.0	48	66	0.57	0.95	3.89	43	0.61
941028	0454	2.32	0.093	10.7	48	68	0.57	0.84	3.84	45	0.39
941028	0754	2.35	0.083	12.0	50	64	0.56	0.98	4.60	39	0.60
941028	1054	2.43	0.074	13.6	52	62	0.56	1.05	4.63	38	0.74
941028	1353	2.31	0.074	13.6	50	64	0.59	1.23	4.54	40	0.88
941028	1705	2.56	0.074	13.6	52	61	0.51	1.17	5.79	31	0.68
941028	1954	2.85	0.074	13.6	50	60	0.51	0.85	5.12	34	0.57
941028	2253	2.95	0.074	13.6	50	58	0.47	0.93	5.79	29	0.35
941029	0151	2.72	0.074	13.6	56	59	0.46	0.94	6.06	27	0.19
941029	0453	2.71	0.074	13.6	50	61	0.50	1.13	5.90	32	0.67
941029	0753	3.18	0.103	9.7	50	59	0.44	0.73	6.15	29	0.39
941029	1053	3.04	0.074	13.6	48	56	0.48	1.10	5.87	30	0.60
941029	1354	3.17	0.074	13.6	50	57	0.46	0.90	5.94	29	0.42
941029	1653	3.24	0.093	10.7	50	55	0.46	0.85	5.91	29	0.37
941029	1953	3.61	0.093	10.7	52	58	0.44	0.73	6.04	27	0.37
941029	2253	3.58	0.103	9.7	52	56	0.43	0.63	5.62	28	0.20
941030	0154	3.72	0.093	10.7	48	52	0.41	0.83	6.28	25	0.19
941030	0451	3.40	0.093	10.7	48	51	0.44	0.78	5.85	29	0.14
941030	0753	3.42	0.093	10.7	46	54	0.43	0.82	6.43	27	0.44
941030	1053	3.14	0.103	9.7	48	55	0.45	0.62	5.69	33	0.39
941030	1353	2.92	0.093	10.7	48	55	0.46	0.68	6.26	28	0.34
941030	1654	2.53	0.103	9.7	54	57	0.48	0.70	6.37	29	0.19
941030	1954	2.73	0.103	9.7	50	57	0.44	0.79	6.83	26	0.44
941030	2253	2.52	0.103	9.7	50	59	0.44	0.67	6.36	30	0.33
941031	0154	2.17	0.083	12.0	50	56	0.48	1.10	6.55	30	0.46
941031	0451	2.33	0.093	10.7	50	57	0.48	0.95	6.18	29	0.39
941031	0753	2.03	0.083	12.0	50	57	0.49	1.44	6.36	26	0.54
941031	1102	2.02	0.074	13.6	54	61	0.50	1.15	5.89	30	0.29
941031	1356	1.81	0.083	12.0	54	62	0.53	1.79	6.34	26	0.51
941031	1652	1.87	0.083	12.0	50	59	0.51	1.83	6.84	25	0.56
941031	1954	1.90	0.083	12.0	52	61	0.48	2.06	7.75	21	0.63

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
941031	2255	1.91	0.083	12.0	54	62	0.53	1.88	6.40	25	0.63
941101	0155	1.80	0.083	12.0	50	62	0.57	1.69	5.39	35	0.95
941101	0456	1.71	0.083	12.0	50	63	0.59	1.81	4.92	36	1.15
941101	0756	1.55	0.083	12.0	52	65	0.58	1.83	5.25	33	1.05
941101	1121	1.46	0.083	12.0	56	69	0.60	1.62	4.76	36	0.97
941101	1701	1.58	0.093	10.7	50	62	0.64	1.68	4.34	40	0.92
941101	1958	1.62	0.093	10.7	46	59	0.59	1.79	4.98	34	1.10
941101	2258	1.63	0.093	10.7	48	61	0.63	1.59	4.28	41	0.93
941102	0200	2.03	0.152	6.6	46	53	0.53	1.56	5.38	28	0.47
941102	0457	3.01	0.123	8.2	46	47	0.45	1.59	7.04	24	0.06
941102	1057	2.94	0.113	8.9	48	50	0.47	1.22	6.01	28	0.05
941102	1356	3.04	0.103	9.7	48	50	0.44	1.28	6.83	25	0.06
941102	1700	3.28	0.103	9.7	46	46	0.45	1.09	5.84	29	0.01
941102	2000	3.64	0.103	9.7	48	46	0.45	0.95	5.16	31	-0.03
941102	2300	3.71	0.103	9.7	44	48	0.42	1.24	6.53	24	0.20
941103	0200	3.30	0.103	9.7	46	51	0.42	1.17	7.23	23	0.24
941103	0457	3.01	0.093	10.7	48	53	0.42	1.15	7.31	25	0.28
941103	0757	2.82	0.093	10.7	46	54	0.46	0.98	5.75	29	0.23
941103	1101	2.98	0.093	10.7	44	52	0.47	1.42	6.50	26	0.44
941103	1352	3.00	0.093	10.7	46	51	0.45	1.11	6.05	27	0.27
941103	1656	2.91	0.093	10.7	44	49	0.44	1.08	5.90	28	0.24
941103	1955	2.60	0.093	10.7	46	49	0.46	1.41	6.85	24	0.21
941103	2255	2.26	0.103	9.7	46	50	0.50	1.26	5.88	29	0.16
941104	0155	2.09	0.093	10.7	44	53	0.50	1.28	5.95	31	0.64
941104	0453	1.94	0.093	10.7	48	54	0.49	1.63	7.17	25	0.35
941104	0755	1.65	0.093	10.7	42	53	0.55	2.03	6.00	27	0.66
941104	1053	1.50	0.093	10.7	44	56	0.61	1.79	5.02	36	1.15
941104	1355	1.63	0.093	10.7	50	57	0.62	1.76	5.07	34	0.42
941104	1708	1.49	0.103	9.7	48	56	0.59	1.79	5.31	31	0.32
941104	1955	1.29	0.103	9.7	56	60	0.67	1.93	4.50	38	0.17
941104	2255	1.20	0.103	9.7	50	68	0.74	1.46	3.31	52	0.69
941105	0155	1.11	0.103	9.7	50	71	0.77	1.61	3.29	51	0.54
941105	0455	1.04	0.064	15.6	46	77	0.81	1.24	2.65	67	0.79
941105	0755	0.90	0.064	15.6	48	88	0.92	0.91	2.22	90	0.64
941105	1052	0.93	0.074	13.6	52	82	0.83	1.05	2.54	77	1.00
941105	1355	0.99	0.074	13.6	56	78	0.77	1.69	3.26	46	0.75
941105	1955	1.44	0.093	10.7	50	65	0.68	2.11	4.44	36	0.80
941105	2255	1.53	0.093	10.7	64	72	0.67	1.39	3.93	42	0.45
941106	0152	1.73	0.064	15.6	50	68	0.60	1.73	5.16	34	0.54
941106	0531	2.10	0.064	15.6	56	68	0.57	1.78	5.41	30	0.91
941106	0755	2.10	0.064	15.6	58	68	0.58	2.27	6.02	29	0.78
941106	1055	2.01	0.074	13.6	50	68	0.63	2.04	4.97	34	0.65
941106	1355	2.21	0.064	15.6	50	65	0.59	2.11	5.99	29	0.70
941106	1655	2.55	0.064	15.6	54	62	0.56	2.84	6.75	23	0.85
941106	1955	2.48	0.064	15.6	56	63	0.56	2.04	6.19	28	0.46
941106	2255	2.32	0.074	13.6	56	65	0.64	2.37	5.24	33	0.72
941107	0155	2.55	0.064	15.6	56	65	0.57	2.58	6.30	24	0.62
941107	0453	2.62	0.064	15.6	54	61	0.53	2.39	7.03	21	0.54
941107	0755	2.56	0.064	15.6	56	63	0.53	2.47	7.45	19	0.43
941107	1053	2.61	0.064	15.6	52	59	0.49	2.45	8.13	18	0.29
941107	1353	2.65	0.074	13.6	50	61	0.51	1.87	6.87	25	0.80
941107	1654	2.69	0.074	13.6	52	66	0.51	1.53	6.07	29	0.78
941107	1956	2.97	0.074	13.6	52	62	0.45	1.71	8.04	24	0.50

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
941107	2253	2.89	0.074	13.6	52	64	0.49	1.30	6.14	29	0.61
941108	0156	3.08	0.074	13.6	52	68	0.52	0.94	4.69	37	0.82
941108	0455	3.22	0.074	13.6	54	70	0.51	0.89	4.62	37	0.69
941108	0755	3.08	0.074	13.6	52	67	0.50	0.97	5.38	33	0.58
941108	1056	2.89	0.074	13.6	52	64	0.52	1.18	5.18	34	0.82
941108	1347	2.86	0.083	12.0	50	64	0.53	1.28	4.80	35	1.04
941108	1655	2.68	0.074	13.6	52	63	0.50	1.25	5.20	32	0.92
941108	1955	2.50	0.093	10.7	54	60	0.52	1.23	5.49	31	0.42
941108	2256	2.32	0.083	12.0	48	60	0.56	1.50	5.00	35	0.94
941109	0155	2.15	0.083	12.0	48	66	0.60	1.25	4.36	43	0.95
941109	0456	2.03	0.083	12.0	48	66	0.60	1.53	4.75	41	1.07
941109	0753	2.07	0.083	12.0	46	62	0.61	1.82	4.87	40	1.04
941109	1054	1.63	0.083	12.0	46	65	0.70	1.70	3.99	47	0.97
941109	1356	1.36	0.083	12.0	52	75	0.81	1.58	3.07	56	0.84
941109	1700	1.16	0.093	10.7	54	93	0.89	1.07	2.20	98	0.94
941109	1956	1.10	0.093	10.7	58	97	0.89	1.02	2.16	97	1.05
941109	2256	2.18	0.083	12.0	56	70	0.58	2.43	5.85	28	0.68
941110	0155	2.82	0.083	12.0	56	68	0.50	1.67	6.16	28	0.68
941110	0453	2.90	0.074	13.6	56	67	0.53	1.66	6.10	29	0.50
941110	0756	3.26	0.074	13.6	56	66	0.49	2.13	7.57	24	0.34
941110	1105	3.62	0.074	13.6	64	67	0.45	1.85	8.56	20	0.04
941110	1356	4.60	0.064	15.6	62	65	0.45	1.38	8.21	22	0.25
941110	1953	4.49	0.064	15.6	60	63	0.44	1.67	8.98	18	0.13
941110	2256	3.76	0.064	15.6	58	62	0.46	1.91	8.78	16	0.34
941111	0156	3.47	0.064	15.6	58	63	0.51	2.10	7.58	20	0.28
941111	0453	3.50	0.064	15.6	54	60	0.44	2.29	9.54	17	0.45
941111	0755	3.23	0.074	13.6	54	60	0.45	2.08	9.13	20	0.37
941111	1056	3.03	0.074	13.6	48	58	0.49	1.87	7.13	26	0.70
941111	1356	3.05	0.074	13.6	50	59	0.56	2.11	6.74	27	0.53
941111	1656	3.00	0.074	13.6	50	57	0.50	1.82	7.00	25	0.43
941111	1955	2.74	0.074	13.6	46	57	0.59	2.29	6.25	30	0.72
941111	2256	2.54	0.083	12.0	56	58	0.54	1.88	6.42	25	0.01
941112	0153	2.29	0.083	12.0	54	60	0.55	1.73	5.96	28	0.34
941112	0456	2.24	0.083	12.0	48	58	0.56	1.87	5.87	30	0.61
941112	0755	2.17	0.083	12.0	42	57	0.54	1.63	5.90	31	0.44
941112	1055	2.14	0.083	12.0	44	56	0.55	1.56	5.54	33	0.44
941112	1355	2.12	0.083	12.0	42	51	0.55	1.98	5.96	28	0.58
941112	1655	1.70	0.093	10.7	38	53	0.63	1.84	4.76	37	0.71
941112	1956	1.69	0.093	10.7	50	58	0.64	1.69	4.62	37	0.39
941112	2325	1.87	0.152	6.6	48	58	0.59	1.31	4.72	39	0.34
941113	0155	2.01	0.132	7.6	56	55	0.55	1.21	5.28	34	-0.10
941113	0455	2.39	0.103	9.7	50	51	0.48	1.46	6.79	29	0.08
941113	0755	2.61	0.093	10.7	48	50	0.44	1.69	8.11	23	0.05
941113	1052	2.52	0.093	10.7	46	48	0.44	1.59	8.44	23	0.00
941113	1356	2.45	0.103	9.7	44	47	0.47	1.87	7.93	24	0.11
941113	1656	2.54	0.093	10.7	42	48	0.43	1.90	9.10	20	0.24
941113	1955	2.31	0.093	10.7	42	46	0.45	2.08	8.83	20	0.22
941113	2255	2.34	0.083	12.0	46	51	0.48	2.03	8.12	21	0.31
941114	0155	2.21	0.093	10.7	46	52	0.47	2.86	9.36	17	0.44
941114	0456	2.32	0.064	15.6	46	50	0.47	3.00	9.53	14	0.16
941114	0753	2.27	0.074	13.6	44	52	0.54	2.44	7.47	18	0.71
941114	1053	2.51	0.074	13.6	48	52	0.43	1.94	10.09	17	0.29
941114	1355	2.51	0.083	12.0	46	52	0.45	2.17	9.84	18	0.39

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_o deg	σ	γ	δ	$\Delta\theta$ deg	A
941114	1656	2.07	0.083	12.0	44	54	0.50	2.20	7.98	23	0.55
941114	1955	1.94	0.074	13.6	48	58	0.51	2.00	7.17	23	0.82
941114	2255	1.68	0.074	13.6	46	60	0.61	2.07	5.46	33	1.14
941115	0155	1.84	0.074	13.6	48	58	0.52	1.84	6.80	26	0.66
941115	0456	1.88	0.083	12.0	46	55	0.48	1.97	8.04	23	0.71
941115	0833	1.84	0.083	12.0	44	53	0.50	2.07	7.05	21	0.62
941115	1053	1.81	0.083	12.0	44	56	0.54	1.54	5.83	32	1.05
941115	1356	1.61	0.093	10.7	46	65	0.53	1.13	5.58	35	0.20
941115	1655	1.30	0.083	12.0	52	65	0.64	1.56	4.88	39	0.44
941115	1956	1.04	0.083	12.0	60	75	0.68	1.29	3.75	40	0.29
941115	2256	1.04	0.083	12.0	60	71	0.57	1.66	5.53	29	0.56
941116	0222	2.29	0.142	7.0	56	67	0.45	0.40	5.87	32	0.12
941116	0456	2.73	0.074	13.6	58	63	0.45	0.14	4.64	32	0.08
941116	0756	3.48	0.074	13.6	52	59	0.42	0.38	6.08	27	0.33
941116	1052	4.09	0.074	13.6	48	60	0.39	0.54	6.44	27	0.42
941116	1354	4.80	0.074	13.6	50	59	0.39	0.46	6.33	25	0.24
941116	1653	5.69	0.074	13.6	48	53	0.39	0.48	5.31	26	0.28
941116	1955	5.14	0.074	13.6	48	53	0.41	0.45	5.25	26	0.32
941116	2255	4.68	0.074	13.6	48	55	0.43	0.33	4.97	31	0.20
941117	0152	4.13	0.074	13.6	46	55	0.44	0.36	4.67	33	0.23
941117	0455	3.99	0.074	13.6	48	54	0.41	0.48	5.79	28	0.23
941117	0755	3.58	0.074	13.6	50	53	0.38	0.88	7.34	22	0.29
941117	1104	3.43	0.083	12.0	48	55	0.41	0.91	8.00	24	0.33
941117	1657	3.85	0.083	12.0	46	52	0.40	1.02	7.53	23	0.48
941117	1955	3.08	0.083	12.0	44	52	0.44	1.17	6.80	26	0.47
941117	2252	3.10	0.074	13.6	48	54	0.44	1.13	6.92	23	0.38
941118	0154	3.54	0.083	12.0	46	54	0.44	0.71	5.38	30	0.40
941118	0454	4.36	0.074	13.6	48	50	0.42	0.59	5.29	29	0.20
941118	0755	4.66	0.074	13.6	44	47	0.40	0.77	6.05	24	0.15
941118	1052	4.21	0.074	13.6	46	51	0.41	0.76	6.53	26	0.21
941118	1355	4.18	0.083	12.0	46	53	0.41	0.76	6.95	26	0.36
941118	1706	4.35	0.083	12.0	48	52	0.40	0.69	7.15	25	0.28
941118	1954	4.05	0.074	13.6	48	50	0.40	0.90	7.79	24	0.17
941118	2255	3.74	0.083	12.0	48	50	0.40	0.99	8.21	22	0.19
941119	0155	3.33	0.083	12.0	48	53	0.41	0.79	7.41	26	0.20
941119	0455	3.12	0.083	12.0	48	51	0.40	0.98	8.29	23	0.18
941119	0755	2.93	0.083	12.0	46	49	0.42	1.36	8.72	22	0.13
941119	1052	2.57	0.083	12.0	44	47	0.45	1.30	8.30	24	0.09
941119	1354	2.41	0.093	10.7	50	50	0.50	1.00	6.34	31	-0.05
941119	1655	2.09	0.083	12.0	44	49	0.51	1.22	6.44	29	0.21
941119	1954	1.94	0.093	10.7	48	50	0.50	1.54	7.36	25	-0.01
941119	2255	1.68	0.093	10.7	50	53	0.57	1.61	5.90	31	0.12
941120	0155	1.75	0.093	10.7	48	55	0.55	1.73	6.48	26	0.41
941120	0454	1.79	0.093	10.7	46	51	0.51	2.01	7.35	26	0.20
941120	0755	1.59	0.093	10.7	46	54	0.58	2.07	6.22	27	0.36
941120	1054	1.32	0.093	10.7	50	58	0.63	2.33	5.71	26	0.67
941120	1354	1.30	0.093	10.7	46	55	0.66	1.88	4.82	38	0.57
941120	1652	1.19	0.103	9.7	56	59	0.68	1.65	4.41	43	0.20
941120	2021	1.28	0.162	6.2	46	54	0.60	1.88	5.63	33	0.16
941120	2254	1.33	0.152	6.6	52	54	0.61	1.77	5.30	34	0.07
941121	0154	1.46	0.142	7.0	54	56	0.59	1.73	5.63	31	0.17
941121	0455	1.30	0.142	7.0	48	55	0.60	1.39	5.23	34	0.39
941121	0754	1.20	0.162	6.2	52	55	0.62	1.88	5.67	34	0.16

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
941121	1054	1.33	0.152	6.6	50	54	0.58	1.80	6.25	32	0.10
941121	1358	1.44	0.152	6.6	48	52	0.56	1.40	5.90	31	0.05
941121	1658	1.81	0.103	9.7	46	50	0.48	1.15	6.13	30	0.06
941121	1954	2.25	0.103	9.7	46	50	0.44	1.15	6.84	26	0.19
941122	0155	2.02	0.093	10.7	46	50	0.44	2.09	10.02	18	0.29
941122	0455	2.18	0.093	10.7	46	51	0.43	1.52	8.75	22	0.51
941122	0754	2.27	0.093	10.7	46	50	0.45	1.55	8.21	23	0.40
941122	1055	2.14	0.093	10.7	50	53	0.51	1.43	7.09	27	0.30
941122	1355	1.82	0.103	9.7	50	55	0.50	2.19	8.40	21	0.60
941122	1658	1.71	0.103	9.7	50	57	0.51	2.28	7.79	22	0.59
941122	1954	1.69	0.083	12.0	48	56	0.51	1.94	7.58	24	0.52
941122	2255	1.58	0.083	12.0	50	55	0.52	2.29	7.64	21	0.45
941123	0152	1.36	0.083	12.0	48	58	0.56	2.12	6.43	25	0.68
941123	0455	1.37	0.083	12.0	48	59	0.59	1.98	6.00	30	0.78
941123	0755	1.41	0.083	12.0	46	57	0.60	1.97	5.71	30	0.51
941123	1054	1.36	0.093	10.7	48	54	0.57	1.98	6.25	30	0.34
941123	1404	1.18	0.093	10.7	44	57	0.68	2.04	4.58	39	0.86
941123	1659	1.08	0.093	10.7	46	63	0.73	1.77	3.73	51	1.31
941123	1959	1.06	0.093	10.7	48	65	0.67	1.34	4.03	46	0.64
941123	2259	1.01	0.103	9.7	52	67	0.71	1.65	3.93	43	0.51
941124	0159	0.92	0.074	13.6	54	65	0.72	1.85	4.00	41	0.74
941124	0500	0.98	0.074	13.6	48	68	0.82	1.93	3.33	51	1.06
941124	0759	1.17	0.074	13.6	48	64	0.70	1.55	3.98	42	0.45
941124	1051	1.20	0.074	13.6	54	65	0.72	1.94	4.20	36	0.70
941124	1359	1.25	0.054	18.5	58	64	0.66	2.48	5.24	26	0.54
941124	1659	1.61	0.064	15.6	54	61	0.53	2.62	7.77	17	0.12
941124	1959	2.01	0.064	15.6	56	59	0.44	2.37	10.25	14	0.12
941124	2259	2.17	0.064	15.6	54	56	0.43	2.73	11.02	13	0.17
941125	0159	2.36	0.064	15.6	56	58	0.42	2.11	10.36	12	0.18
941125	0459	2.18	0.064	15.6	54	56	0.44	2.41	10.58	14	0.11
941125	0800	2.07	0.064	15.6	58	57	0.46	2.03	9.71	18	-0.17
941125	1056	2.06	0.074	13.6	58	59	0.48	1.80	8.49	20	0.03
941125	1359	1.91	0.074	13.6	54	64	0.52	1.61	7.01	27	0.35
941125	1659	2.07	0.083	12.0	54	65	0.51	1.44	6.44	29	0.42
941125	2259	2.03	0.074	13.6	52	64	0.52	1.23	5.61	32	0.58
941126	0159	2.63	0.093	10.7	52	61	0.45	1.24	6.69	26	0.57
941126	0459	3.08	0.093	10.7	56	63	0.41	0.88	6.83	25	0.32
941126	0759	4.00	0.083	12.0	52	62	0.44	0.41	4.94	32	0.16
941126	1059	4.70	0.074	13.6	56	60	0.43	0.33	4.83	28	0.01
941126	1359	4.81	0.074	13.6	64	61	0.44	0.27	5.35	26	-0.03
941126	1659	4.77	0.064	15.6	58	62	0.45	0.29	5.09	29	0.06
941126	1956	4.86	0.064	15.6	64	60	0.43	0.28	5.42	26	-0.15
941126	2259	4.66	0.064	15.6	58	60	0.41	0.53	6.59	23	0.18
941127	0159	4.74	0.064	15.6	58	59	0.39	0.47	7.35	21	0.07
941127	0459	4.55	0.074	13.6	54	58	0.40	0.77	7.60	22	0.28
941127	0759	3.75	0.074	13.6	54	59	0.42	0.71	7.42	23	0.28
941127	1056	3.08	0.074	13.6	54	58	0.47	0.85	6.36	29	0.20
941127	1359	3.09	0.083	12.0	54	58	0.45	0.89	6.53	24	0.32
941127	1657	2.55	0.074	13.6	50	61	0.53	1.26	5.48	30	0.74
941127	1959	2.61	0.074	13.6	54	61	0.48	0.75	6.02	27	0.44
941127	2259	2.67	0.083	12.0	52	57	0.47	1.07	6.32	25	0.39
941128	0159	2.46	0.083	12.0	50	57	0.48	1.31	6.62	23	0.41
941128	0459	2.20	0.083	12.0	50	59	0.52	1.22	5.64	31	0.83

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Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
941128	0759	2.04	0.083	12.0	50	57	0.52	1.26	6.00	27	0.59
941128	1104	1.84	0.083	12.0	50	57	0.58	1.17	5.08	36	0.51
941128	1352	1.75	0.083	12.0	46	55	0.58	1.13	4.81	37	0.57
941128	1654	1.77	0.083	12.0	48	55	0.54	1.08	5.11	36	0.30
941128	1954	1.91	0.093	10.7	50	59	0.53	0.85	5.12	36	0.38
941128	2250	2.25	0.093	10.7	48	53	0.48	1.02	6.46	29	0.28
941129	0455	2.43	0.083	12.0	50	54	0.47	1.52	7.93	23	0.25
941129	0754	2.39	0.083	12.0	48	53	0.44	2.22	9.81	16	0.43
941129	1054	2.16	0.074	13.6	50	54	0.47	1.96	8.65	16	0.25
941129	1357	2.08	0.074	13.6	48	54	0.49	2.03	7.82	20	0.48
941129	1657	2.10	0.083	12.0	48	55	0.50	2.23	7.66	18	0.66
941129	1955	2.15	0.074	13.6	50	57	0.48	2.06	7.90	20	0.72
941129	2255	1.98	0.083	12.0	46	55	0.50	2.36	7.76	20	0.79
941130	0155	1.72	0.083	12.0	46	58	0.55	2.07	6.45	27	0.87
941130	0455	1.44	0.083	12.0	50	60	0.57	2.15	6.22	26	0.81
941130	0755	1.52	0.083	12.0	48	59	0.56	2.27	6.55	24	0.98
941130	1054	1.61	0.083	12.0	48	60	0.57	1.94	6.11	32	0.82
941130	1354	1.54	0.083	12.0	50	63	0.56	1.99	6.33	30	0.74
941130	1658	1.52	0.083	12.0	50	68	0.67	2.08	4.59	38	0.67
941130	1954	1.34	0.083	12.0	50	70	0.67	1.78	4.41	39	0.55
941130	2253	1.34	0.083	12.0	52	69	0.64	1.99	4.75	34	0.54
941201	0155	1.28	0.083	12.0	52	71	0.68	1.92	4.18	38	0.46
941201	0454	1.25	0.083	12.0	50	67	0.64	1.99	4.92	35	0.64
941201	0755	1.31	0.093	10.7	54	72	0.68	1.69	4.30	37	0.49
941201	1055	1.41	0.093	10.7	56	73	0.65	1.81	4.65	35	0.31
941201	1355	1.60	0.152	6.6	56	66	0.58	1.32	5.11	36	0.30
941201	1700	1.50	0.152	6.6	54	67	0.60	1.57	5.16	36	0.48
941201	1955	1.68	0.093	10.7	50	62	0.58	1.54	5.40	33	0.44
941201	2255	1.86	0.083	12.0	46	56	0.55	1.67	6.03	31	0.74
941202	0155	2.06	0.083	12.0	48	58	0.54	1.86	6.70	30	0.43
941202	0455	1.99	0.093	10.7	48	59	0.56	1.92	6.31	29	0.39
941202	0754	2.04	0.093	10.7	54	60	0.54	1.88	6.93	27	0.08
941202	1057	2.00	0.083	12.0	52	61	0.52	1.77	7.57	26	0.02
941202	1359	1.83	0.093	10.7	58	61	0.53	1.38	6.17	29	0.08
941202	1657	1.71	0.093	10.7	56	62	0.58	1.52	5.28	34	0.15
941202	1955	1.56	0.093	10.7	54	62	0.61	1.82	5.15	33	0.36
941203	0154	1.83	0.074	13.6	50	59	0.56	1.96	6.07	27	0.50
941203	0454	2.31	0.074	13.6	48	54	0.49	2.28	7.82	21	0.37
941203	0755	2.49	0.074	13.6	46	54	0.48	2.35	8.47	19	0.59
941203	1054	2.32	0.064	15.6	48	58	0.59	2.35	6.28	27	0.61
941203	1354	2.27	0.074	13.6	48	56	0.57	2.66	6.83	24	0.53
941203	1655	2.20	0.074	13.6	48	57	0.56	2.66	6.78	22	0.48
941203	1954	2.17	0.074	13.6	50	58	0.61	3.14	6.11	22	0.61
941203	2255	2.06	0.074	13.6	50	60	0.61	2.42	5.72	27	0.77
941204	0154	2.04	0.074	13.6	46	58	0.57	2.39	6.27	27	0.95
941204	0455	2.02	0.083	12.0	50	59	0.62	1.84	5.05	33	0.48
941204	0755	1.76	0.074	13.6	50	63	0.68	2.13	4.57	36	0.78
941204	1055	1.88	0.074	13.6	48	60	0.60	2.26	5.51	29	0.81
941204	1355	2.20	0.093	10.7	48	58	0.51	1.56	6.51	28	0.37
941204	1654	2.38	0.093	10.7	44	54	0.53	2.18	6.81	27	0.60
941204	1955	2.23	0.083	12.0	50	56	0.53	1.47	5.90	29	0.31
941204	2255	2.41	0.083	12.0	48	59	0.52	2.01	6.75	28	0.65
941205	0152	2.38	0.093	10.7	44	55	0.52	2.10	6.81	27	0.73

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
941205	0455	2.41	0.093	10.7	44	56	0.53	1.81	6.04	30	0.88
941205	0754	2.23	0.083	12.0	50	58	0.56	1.61	5.46	30	0.53
941205	1052	1.94	0.093	10.7	42	58	0.63	1.49	4.40	41	0.98
941205	1355	1.93	0.093	10.7	42	60	0.62	1.49	4.62	40	0.40
941205	1655	2.15	0.093	10.7	42	61	0.55	1.29	4.97	38	0.35
941205	1951	2.05	0.093	10.7	48	59	0.58	1.12	4.47	40	0.42
941205	2254	1.75	0.093	10.7	46	60	0.63	1.00	3.69	47	0.49
941206	0154	1.80	0.152	6.6	46	61	0.61	1.12	4.14	42	0.40
941206	0455	1.76	0.074	13.6	56	60	0.59	1.20	4.48	39	0.24
941206	0754	1.52	0.074	13.6	42	63	0.65	1.06	3.73	48	0.23
941206	1054	1.31	0.074	13.6	30	66	0.72	0.93	3.22	56	0.09
941206	1654	1.11	0.074	13.6	54	76	0.72	1.01	3.13	51	0.29
941206	1954	0.97	0.074	13.6	56	82	0.73	0.73	2.86	57	0.16
941206	2254	0.93	0.074	13.6	88	80	0.71	0.90	3.19	49	-0.07
941207	0154	1.58	0.162	6.2	60	63	0.59	1.04	4.64	39	0.11
941207	0455	2.07	0.142	7.0	52	51	0.50	0.94	5.00	35	0.02
941207	0754	2.17	0.132	7.6	50	53	0.45	1.04	6.41	28	0.18
941207	1054	2.32	0.123	8.2	52	57	0.42	0.61	7.51	25	0.13
941207	1353	2.61	0.064	15.6	54	57	0.43	0.87	8.44	21	0.24
941207	1653	3.08	0.064	15.6	52	55	0.39	0.84	7.80	20	0.17
941207	1954	3.35	0.064	15.6	54	56	0.38	0.65	8.70	20	0.10
941207	2254	3.37	0.064	15.6	58	57	0.37	0.76	9.84	19	0.02
941208	0153	3.08	0.064	15.6	50	58	0.41	1.00	8.31	20	0.42
941208	0454	3.05	0.074	13.6	52	58	0.40	1.00	8.10	19	0.56
941208	0753	3.00	0.064	15.6	52	57	0.37	0.88	9.10	19	0.45
941208	1354	2.70	0.074	13.6	50	60	0.42	0.88	7.90	24	0.59
941208	1653	2.68	0.074	13.6	52	63	0.44	0.63	7.07	27	0.45
941208	1953	2.69	0.074	13.6	52	64	0.41	0.55	7.22	27	0.37
941208	2253	2.69	0.074	13.6	56	60	0.38	0.47	8.32	22	0.14
941209	0153	2.37	0.083	12.0	52	60	0.44	0.78	7.07	26	0.46
941209	0454	2.35	0.083	12.0	48	60	0.44	0.62	6.49	29	0.53
941209	0754	2.29	0.083	12.0	48	57	0.44	0.53	7.18	27	0.44
941209	1052	2.19	0.093	10.7	48	56	0.44	0.49	6.96	28	0.36
941209	1353	2.00	0.083	12.0	50	58	0.47	0.66	6.30	29	0.49
941209	1653	1.88	0.083	12.0	48	57	0.49	0.78	6.31	29	0.44
941209	1951	1.86	0.083	12.0	52	59	0.45	0.62	6.64	28	0.43
941209	2253	1.61	0.083	12.0	50	59	0.47	0.74	6.85	30	0.45
941210	0153	1.50	0.093	10.7	50	58	0.47	0.89	7.27	26	0.40
941210	0454	1.43	0.103	9.7	44	53	0.52	1.18	6.28	30	0.49
941210	0750	1.39	0.093	10.7	48	56	0.51	1.04	6.34	29	0.31
941210	1053	1.29	0.083	12.0	46	56	0.49	1.20	6.54	28	0.61
941210	1350	1.27	0.093	10.7	48	56	0.51	1.81	6.47	26	0.77
941210	1650	1.12	0.083	12.0	48	59	0.56	1.61	5.68	30	0.71
941210	1954	1.08	0.093	10.7	46	56	0.56	1.63	5.83	30	0.69
941210	2253	0.90	0.093	10.7	44	55	0.61	1.38	4.74	38	0.49
941211	0450	0.76	0.103	9.7	48	61	0.69	1.30	3.92	40	0.55
941211	0754	0.83	0.103	9.7	56	62	0.63	1.34	4.66	34	0.31
941211	1053	1.02	0.113	8.9	54	60	0.54	1.29	5.60	29	0.29
941211	1353	1.30	0.074	13.6	50	60	0.51	1.38	5.84	27	0.46
941211	1653	2.11	0.083	12.0	50	56	0.40	1.08	8.45	21	0.39
941211	1953	2.56	0.083	12.0	52	55	0.44	1.17	7.32	23	0.20
941211	2253	2.62	0.083	12.0	48	56	0.42	0.86	6.64	24	0.57
941212	0154	2.21	0.083	12.0	50	55	0.47	1.14	6.85	25	0.46

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
941212	0454	1.78	0.083	12.0	50	58	0.53	1.27	6.00	29	0.49
941212	0752	1.72	0.083	12.0	54	64	0.52	1.35	6.16	27	0.26
941212	1055	1.67	0.093	10.7	56	63	0.50	1.45	6.68	27	0.33
941212	1431	1.72	0.093	10.7	54	63	0.51	1.34	6.13	29	0.47
941212	1655	1.78	0.093	10.7	56	64	0.50	1.14	6.07	28	0.21
941212	1957	2.02	0.093	10.7	50	62	0.53	1.05	5.57	31	0.47
941212	2256	2.28	0.093	10.7	58	63	0.47	1.03	6.78	26	0.23
941213	0156	2.56	0.093	10.7	64	63	0.44	1.05	7.54	23	-0.03
941213	0456	2.64	0.083	12.0	56	62	0.47	1.74	7.61	22	0.37
941213	1056	2.91	0.083	12.0	58	65	0.45	1.05	7.25	24	0.16
941213	1355	2.97	0.083	12.0	56	64	0.45	1.30	7.74	23	0.30
941213	1656	3.01	0.074	13.6	64	65	0.46	1.23	6.82	25	0.12
941213	1956	3.18	0.074	13.6	58	68	0.50	1.06	5.71	29	0.40
941213	2256	3.63	0.074	13.6	60	66	0.44	0.87	7.08	23	0.08
941214	0156	3.65	0.074	13.6	58	66	0.44	0.76	6.87	26	0.06
941214	0456	3.04	0.074	13.6	76	66	0.48	0.79	6.06	29	0.00
941214	0756	2.99	0.064	15.6	74	69	0.48	0.51	5.97	29	-0.19
941214	1056	3.08	0.074	13.6	62	68	0.46	0.57	6.00	28	0.22
941214	1739	2.63	0.074	13.6	78	76	0.49	0.53	6.17	25	-0.17
941214	1953	2.60	0.074	13.6	76	78	0.50	0.74	6.30	25	0.11
941214	2253	2.46	0.074	13.6	72	76	0.46	0.86	7.38	22	0.17
941215	0153	2.29	0.074	13.6	72	75	0.47	0.64	7.30	22	0.03
941215	0451	2.05	0.074	13.6	72	76	0.53	0.81	6.19	25	0.13
941215	0751	2.17	0.054	18.5	68	73	0.46	0.80	7.43	21	0.34
941215	1108	2.36	0.054	18.5	70	70	0.47	0.72	6.69	21	0.06
941215	1422	2.52	0.054	18.5	70	67	0.50	0.28	5.55	26	-0.26
941215	1655	2.53	0.054	18.5	70	70	0.48	0.07	5.70	22	0.08
941215	1955	2.49	0.054	18.5	70	69	0.49	0.11	5.07	27	-0.11
941215	2255	2.58	0.064	15.6	66	69	0.48	0.14	5.15	26	0.24
941216	0155	2.59	0.064	15.6	70	69	0.46	0.12	5.97	23	-0.13
941216	0455	2.36	0.064	15.6	66	66	0.48	0.52	5.60	29	-0.06
941216	0755	2.50	0.064	15.6	64	67	0.47	0.40	6.19	24	0.23
941216	1113	2.55	0.064	15.6	68	69	0.46	0.37	5.79	27	0.06
941216	1403	2.78	0.064	15.6	66	68	0.44	0.13	6.10	22	0.16
941216	1700	2.57	0.064	15.6	66	67	0.45	0.13	5.79	24	0.05
941216	1955	2.25	0.064	15.6	70	67	0.49	0.35	5.53	26	-0.10
941217	0215	2.97	0.054	18.5	68	68	0.44	0.30	7.23	20	0.02
941217	0455	3.00	0.054	18.5	66	66	0.37	0.37	9.60	14	-0.03
941217	0753	2.94	0.064	15.6	66	65	0.40	0.72	9.91	14	-0.02
941217	1052	3.20	0.064	15.6	64	65	0.41	0.92	9.06	18	0.07
941217	1415	3.07	0.064	15.6	66	66	0.40	0.39	8.30	18	-0.01
941217	1655	2.94	0.064	15.6	68	64	0.42	0.46	7.41	21	-0.30
941217	1955	2.78	0.064	15.6	66	64	0.41	0.59	7.88	20	-0.20
941217	2255	2.61	0.064	15.6	68	67	0.45	0.42	6.26	24	-0.09
941218	0155	2.46	0.074	13.6	66	68	0.48	0.53	5.72	26	0.09
941218	0455	2.51	0.074	13.6	64	68	0.44	0.61	7.15	23	0.24
941218	0755	2.22	0.074	13.6	66	66	0.44	0.73	7.44	22	-0.01
941218	1055	2.16	0.074	13.6	68	71	0.48	0.74	6.38	27	0.11
941218	1352	2.21	0.074	13.6	76	72	0.46	0.59	6.72	26	-0.09
941218	1655	1.94	0.074	13.6	64	69	0.52	0.49	5.03	34	0.19
941218	1955	2.10	0.074	13.6	74	69	0.51	0.37	4.70	35	-0.14
941218	2255	2.59	0.074	13.6	70	69	0.45	0.61	6.70	23	-0.02
941219	0155	4.29	0.064	15.6	72	71	0.37	0.04	8.27	16	-0.10

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Table A1 (Continued)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	$\Delta\theta$ deg	A
941219	0455	4.57	0.064	15.6	78	73	0.41	0.06	7.35	23	-0.31
941219	1652	4.33	0.064	15.6	78	75	0.39	-0.06	8.35	17	-0.20
941219	1957	3.78	0.064	15.6	76	74	0.42	0.07	7.20	20	-0.10
941219	2258	3.48	0.064	15.6	78	75	0.40	0.07	7.80	20	-0.29
941220	0158	3.27	0.064	15.6	74	73	0.42	0.46	7.26	21	-0.10
941220	0458	3.11	0.064	15.6	72	73	0.41	0.43	7.81	22	0.06
941220	0758	2.98	0.064	15.6	72	72	0.44	0.74	7.11	23	0.02
941220	1058	3.01	0.074	13.6	58	69	0.46	0.90	7.03	27	0.16
941220	1355	3.17	0.074	13.6	72	69	0.42	0.74	7.65	23	-0.21
941220	1656	3.25	0.064	15.6	72	71	0.40	0.59	8.07	21	-0.12
941220	1955	3.36	0.064	15.6	76	73	0.41	0.44	7.15	24	-0.21
941220	2255	3.13	0.074	13.6	76	74	0.44	0.48	6.76	25	-0.17
941221	0157	3.46	0.074	13.6	76	75	0.41	0.53	7.74	22	-0.09
941221	0451	3.86	0.064	15.6	74	76	0.39	0.43	7.98	19	0.23
941221	0818	3.92	0.064	15.6	74	77	0.40	0.40	8.12	19	0.38
941222	0157	4.00	0.064	15.6	76	79	0.41	0.39	7.50	21	0.25
941222	0458	3.74	0.064	15.6	78	80	0.44	0.06	6.05	28	0.03
941222	0757	3.66	0.064	15.6	74	78	0.46	0.06	5.90	26	0.17
941222	1058	3.67	0.064	15.6	70	76	0.44	0.36	6.37	25	0.40
941222	1357	3.71	0.064	15.6	70	76	0.40	0.55	7.21	22	0.55
941222	1750	3.57	0.064	15.6	74	75	0.41	0.34	7.28	20	0.10
941222	1958	3.44	0.064	15.6	70	73	0.43	0.57	7.00	20	0.26
941222	2258	3.90	0.064	15.6	70	73	0.41	0.59	7.57	19	0.18
941223	0157	3.87	0.064	15.6	68	75	0.44	0.44	6.33	27	0.30
941223	0457	3.63	0.064	15.6	66	72	0.44	0.49	6.08	27	0.47
941223	0758	3.47	0.064	15.6	66	71	0.45	0.53	6.21	25	0.31
941223	1051	3.62	0.064	15.6	64	69	0.43	0.84	7.61	21	0.38
941223	1351	3.85	0.064	15.6	64	69	0.41	0.86	7.91	21	0.25
941223	1657	3.72	0.064	15.6	66	69	0.41	1.01	8.53	17	0.21
941223	1951	3.44	0.064	15.6	68	72	0.42	0.91	8.05	22	0.25
941223	2258	3.19	0.064	15.6	72	74	0.45	1.30	8.29	19	0.05
941224	0157	2.82	0.064	15.6	70	76	0.48	1.19	6.97	25	0.40
941224	0457	2.71	0.074	13.6	82	80	0.50	0.70	6.29	26	-0.05
941224	0757	2.49	0.074	13.6	72	80	0.50	0.94	6.03	29	0.17
941224	1051	2.52	0.074	13.6	76	81	0.45	1.47	7.91	20	0.23
941224	1351	2.62	0.074	13.6	68	79	0.48	1.23	6.63	26	0.63
941224	1658	2.41	0.074	13.6	68	80	0.51	0.93	5.74	31	0.44
941224	1958	2.61	0.074	13.6	76	78	0.51	0.61	5.30	34	0.15
941224	2251	3.10	0.074	13.6	80	72	0.51	0.20	4.19	37	-0.06
941225	0157	3.28	0.123	8.2	76	72	0.48	0.15	4.74	33	-0.09
941225	0457	3.42	0.093	10.7	80	74	0.48	0.12	4.13	36	-0.13
941225	0757	4.15	0.093	10.7	82	75	0.44	-0.21	4.42	32	-0.29
941225	1040	4.39	0.083	12.0	82	75	0.42	-0.29	5.51	26	-0.36
941225	1351	4.48	0.093	10.7	84	74	0.45	-0.18	4.37	33	-0.35
941225	1658	4.53	0.083	12.0	68	70	0.47	0.05	4.33	34	-0.05
941225	1957	4.16	0.083	12.0	80	69	0.47	-0.03	4.32	35	-0.18
941225	2258	4.18	0.093	10.7	72	68	0.43	0.14	5.16	29	-0.03
941226	0158	4.25	0.074	13.6	72	69	0.44	0.11	4.88	30	-0.07
941226	0457	4.00	0.083	12.0	78	70	0.43	0.12	5.37	31	-0.33
941226	0757	3.57	0.093	10.7	64	68	0.46	0.17	4.69	34	0.01
941226	1057	3.15	0.103	9.7	62	66	0.48	0.22	4.50	36	0.06
941226	1359	2.88	0.103	9.7	54	66	0.51	0.34	3.69	43	0.44
941226	1658	2.58	0.083	12.0	58	68	0.52	0.27	3.78	43	0.18

(Sheet 44 of 45)

Table A1 (Concluded)

Date	Time GMT	H_{mo} m	f_p Hz	T_p sec	θ_p deg	θ_0 deg	σ	γ	δ	Δθ deg	A
941226	1957	2.63	0.083	12.0	56	66	0.50	0.27	4.10	39	0.26
941226	2257	2.56	0.083	12.0	60	64	0.48	0.37	4.86	33	0.15
941227	0158	2.67	0.083	12.0	60	63	0.45	0.60	5.98	27	0.22
941227	0458	2.71	0.074	13.6	64	66	0.46	0.54	6.08	28	0.16
941227	0757	2.72	0.074	13.6	58	65	0.46	0.60	6.85	27	0.20
941227	1058	2.98	0.074	13.6	70	67	0.41	0.35	7.40	23	-0.04
941227	1357	3.18	0.074	13.6	68	68	0.41	0.70	8.69	21	0.03
941227	1657	3.63	0.074	13.6	74	72	0.39	0.12	8.29	21	-0.20
941227	1958	3.30	0.074	13.6	74	72	0.39	0.52	8.56	21	-0.16
941227	2257	3.28	0.074	13.6	78	75	0.40	0.24	7.63	22	-0.18
941228	0158	2.85	0.064	15.6	74	74	0.40	0.37	8.69	21	0.03
941228	0458	3.02	0.074	13.6	74	74	0.40	0.53	8.73	21	-0.02
941228	0758	2.90	0.074	13.6	70	74	0.42	0.52	7.16	24	0.13
941228	1047	2.74	0.074	13.6	74	73	0.40	0.51	7.83	22	-0.06
941228	1247	2.63	0.074	13.6	72	72	0.42	0.67	7.70	23	0.01
941228	1455	2.58	0.083	12.0	76	71	0.45	0.34	5.86	28	-0.03
941228	1655	2.70	0.074	13.6	64	70	0.47	0.36	5.28	30	0.08
941228	1848	2.75	0.083	12.0	66	70	0.48	0.40	5.30	30	0.14
941228	2055	2.84	0.074	13.6	56	71	0.50	0.34	4.85	35	0.17
941228	2255	2.94	0.083	12.0	76	69	0.48	0.11	4.73	34	-0.02
941229	0055	2.67	0.083	12.0	76	69	0.51	0.22	4.37	36	-0.01
941229	0255	2.65	0.083	12.0	76	71	0.47	0.38	5.31	32	0.00
941229	0455	2.55	0.083	12.0	56	71	0.49	0.56	5.50	33	0.17
941229	0655	2.56	0.093	10.7	56	70	0.48	0.55	5.56	32	0.18
941229	0855	2.49	0.093	10.7	72	70	0.49	0.49	5.63	31	0.03
941229	1055	2.39	0.083	12.0	60	69	0.48	0.66	6.03	31	0.16
941229	1255	2.47	0.074	13.6	60	70	0.50	0.65	5.35	33	0.18
941229	1510	2.46	0.093	10.7	56	70	0.54	0.61	4.62	39	0.33
941229	1704	2.36	0.074	13.6	54	70	0.55	0.78	4.69	38	0.46
941229	1855	2.34	0.083	12.0	54	70	0.54	0.68	4.27	40	0.27
941229	2055	2.48	0.093	10.7	56	69	0.55	0.65	4.00	40	0.41
941229	2255	2.44	0.093	10.7	52	66	0.53	0.95	5.07	36	0.37
941230	0055	2.33	0.093	10.7	50	62	0.51	1.07	5.35	34	0.46
941230	0255	2.16	0.093	10.7	56	65	0.57	1.12	4.62	38	0.33
941230	0455	2.07	0.093	10.7	60	70	0.57	0.99	4.85	35	0.14
941230	0655	2.01	0.103	9.7	72	75	0.59	0.69	4.18	40	0.23
941230	0855	2.06	0.103	9.7	70	73	0.58	0.87	4.50	37	0.29
941230	1056	2.07	0.054	18.5	70	72	0.57	1.10	4.82	33	0.10
941230	1339	2.21	0.054	18.5	70	71	0.54	1.11	5.40	23	0.02
941230	1440	2.30	0.054	18.5	70	70	0.52	1.18	5.87	21	-0.19
941230	1655	2.20	0.054	18.5	70	72	0.52	1.26	5.90	22	0.06
941230	1855	2.26	0.054	18.5	68	73	0.49	1.46	6.61	18	0.29
941230	2055	2.39	0.054	18.5	76	78	0.49	0.95	5.99	24	0.08
941230	2255	2.44	0.054	18.5	80	83	0.51	0.59	5.18	29	0.11
941231	0055	2.38	0.054	18.5	82	82	0.48	0.89	6.65	22	-0.12
941231	0255	2.35	0.064	15.6	78	85	0.47	0.61	6.24	25	0.39
941231	0455	2.57	0.064	15.6	76	82	0.44	0.79	7.06	22	0.36
941231	0655	2.47	0.064	15.6	74	81	0.46	1.30	7.53	17	0.55
941231	1057	2.55	0.064	15.6	80	82	0.45	1.08	8.54	15	0.03
941231	1358	2.48	0.064	15.6	76	84	0.44	1.02	7.28	22	0.45
941231	1658	2.57	0.064	15.6	78	86	0.43	1.06	7.23	22	0.43
941231	1955	2.87	0.064	15.6	82	86	0.41	0.71	7.19	20	0.27
941231	2257	2.89	0.064	15.6	78	87	0.44	0.49	6.40	25	0.30

(Sheet 45 of 45)

Appendix B
Time Series Graphs of Bulk Parameters
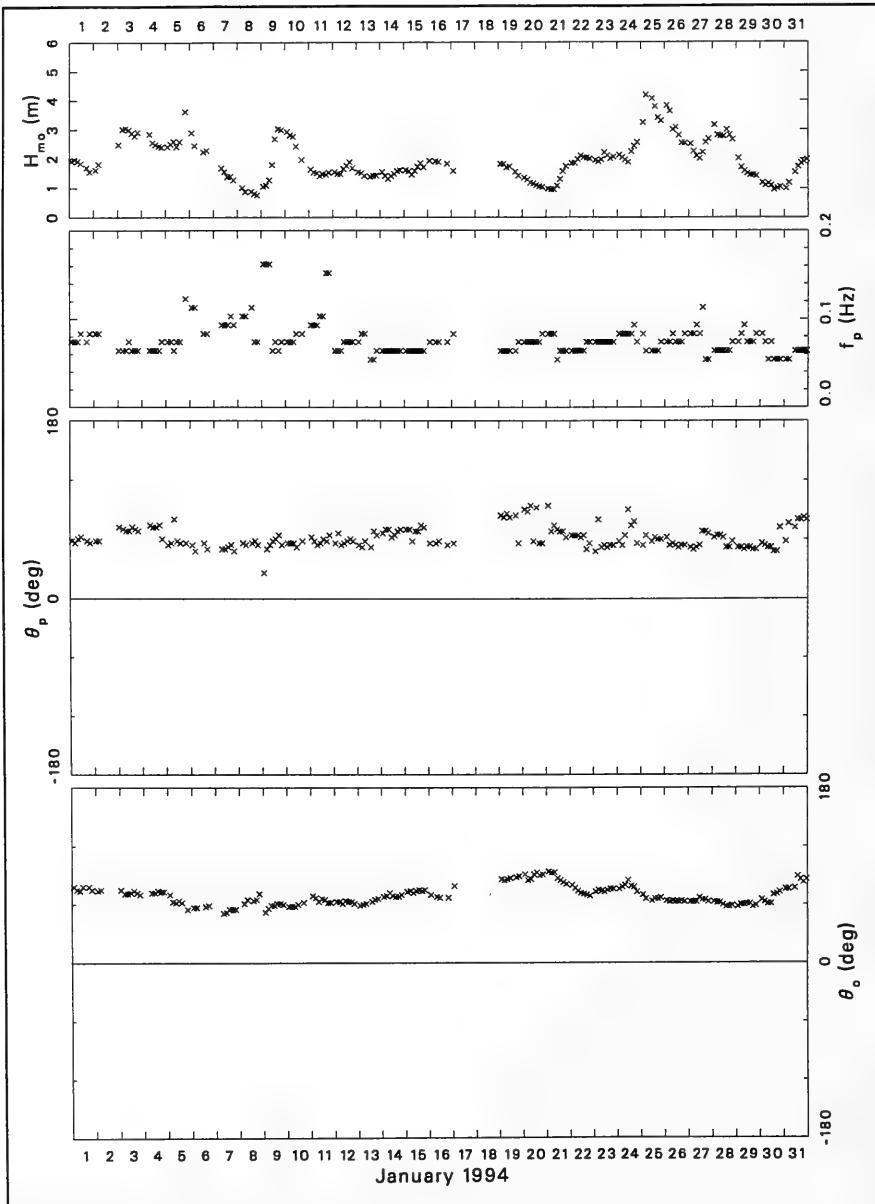
Figure B1. Bulk data for January 1994 (Continued)
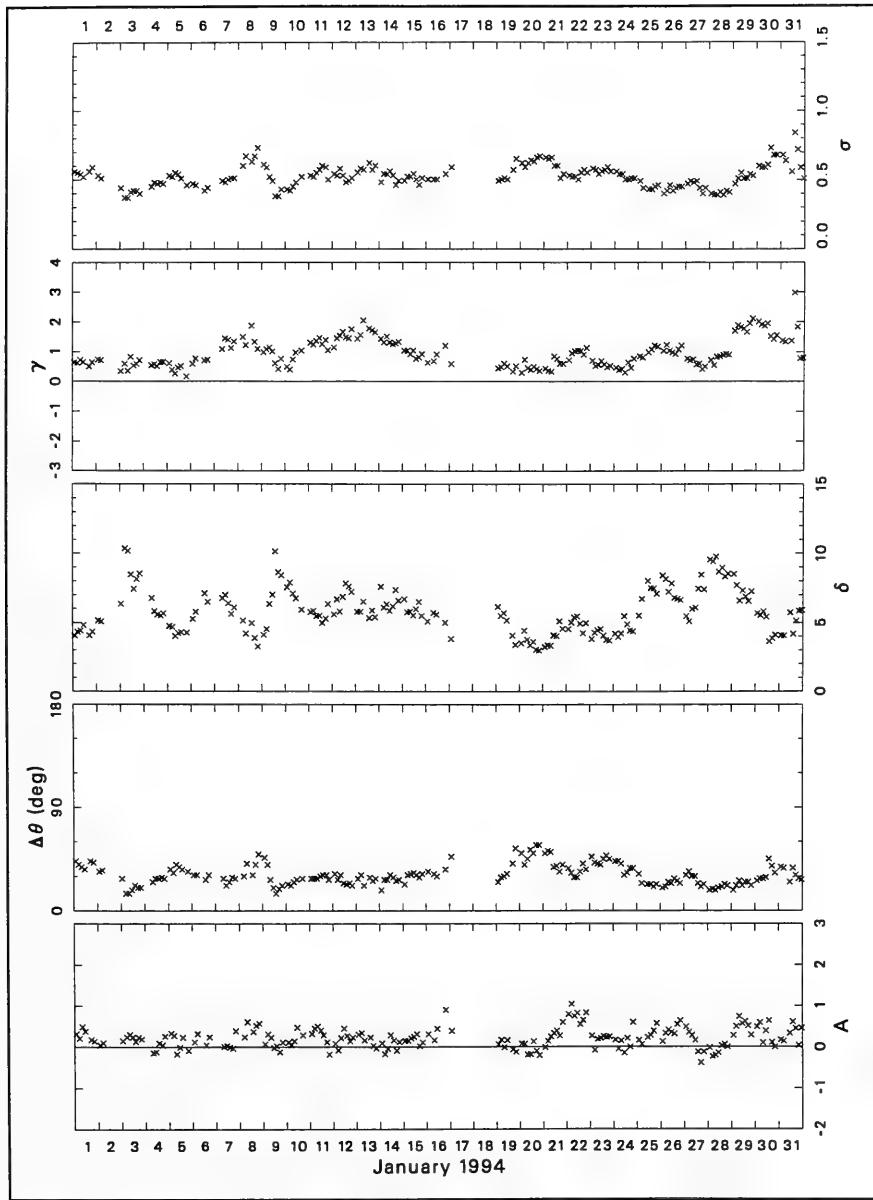
Figure B1. (Concluded)
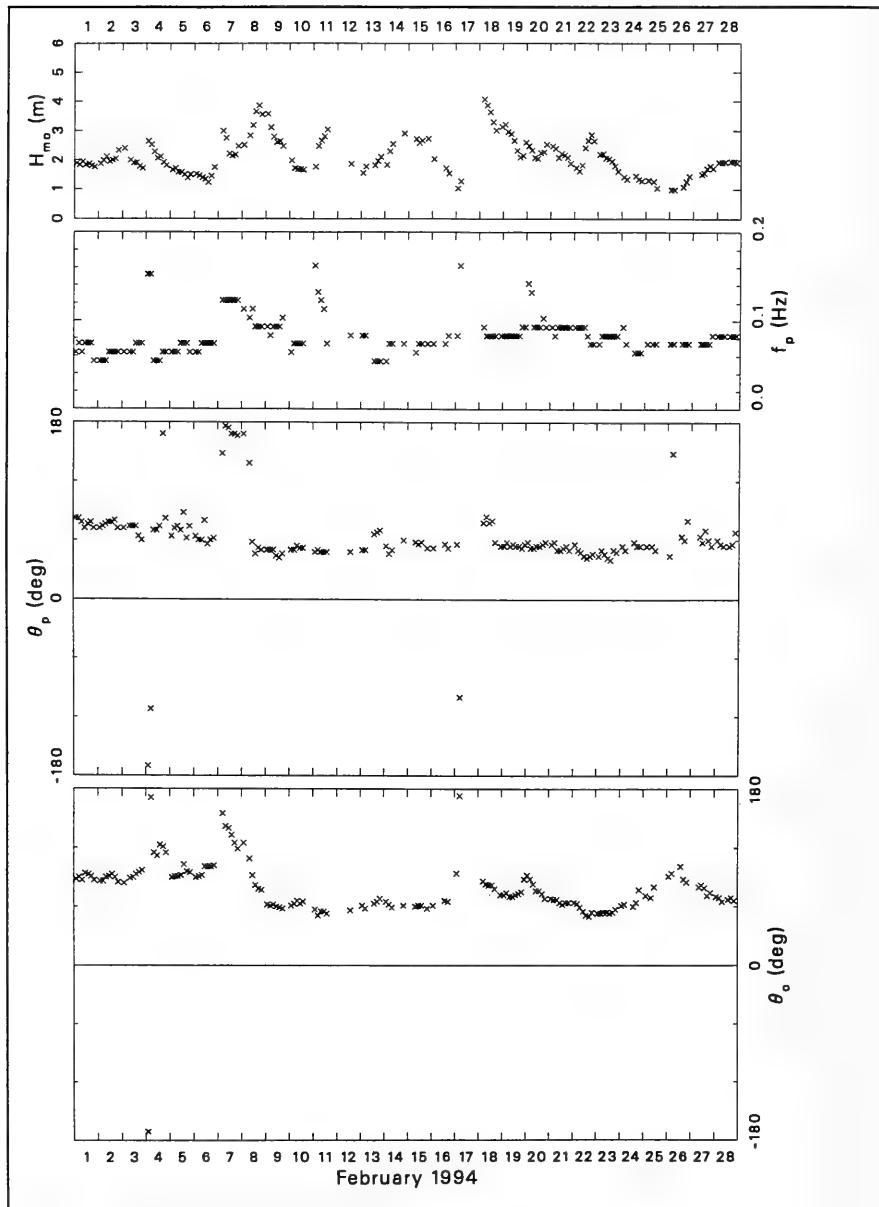
Figure B2. Bulk data for February 1994 (Continued)
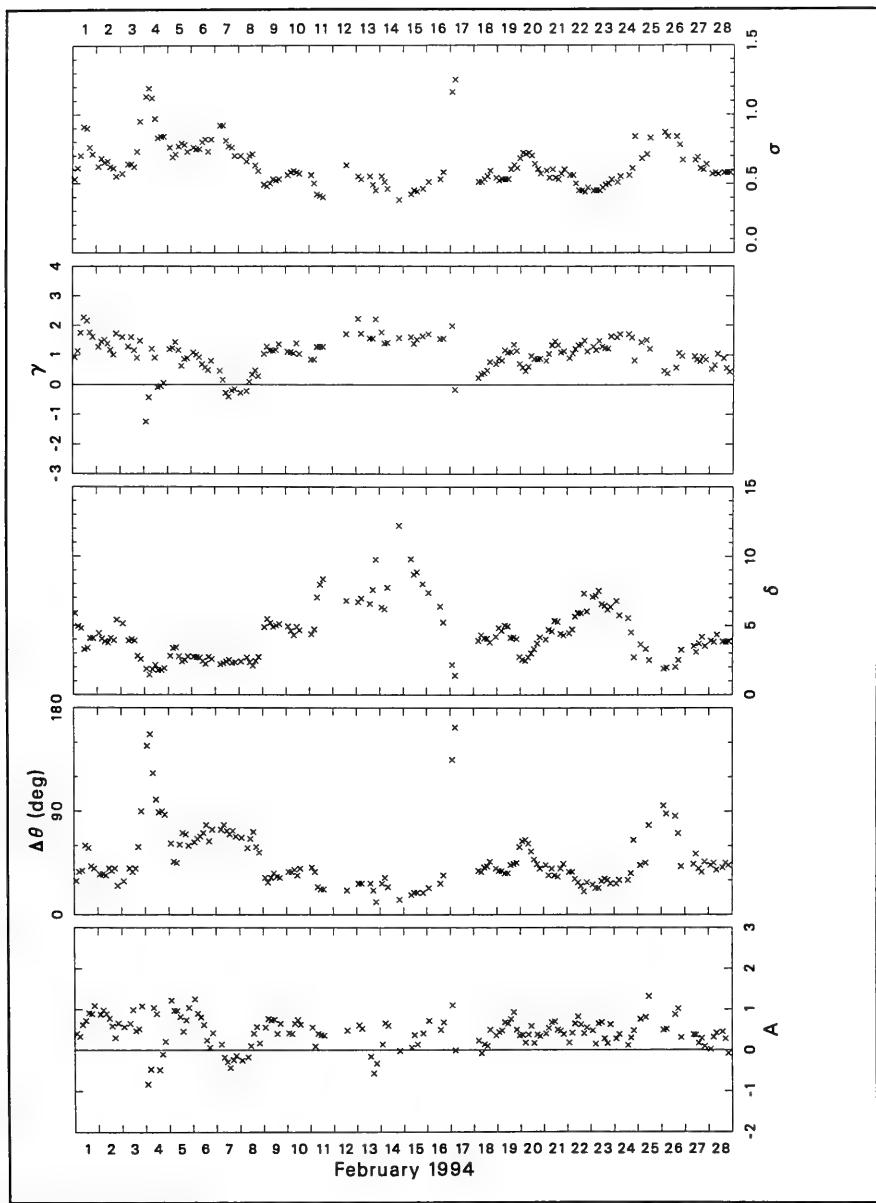
Figure B2. (Concluded)
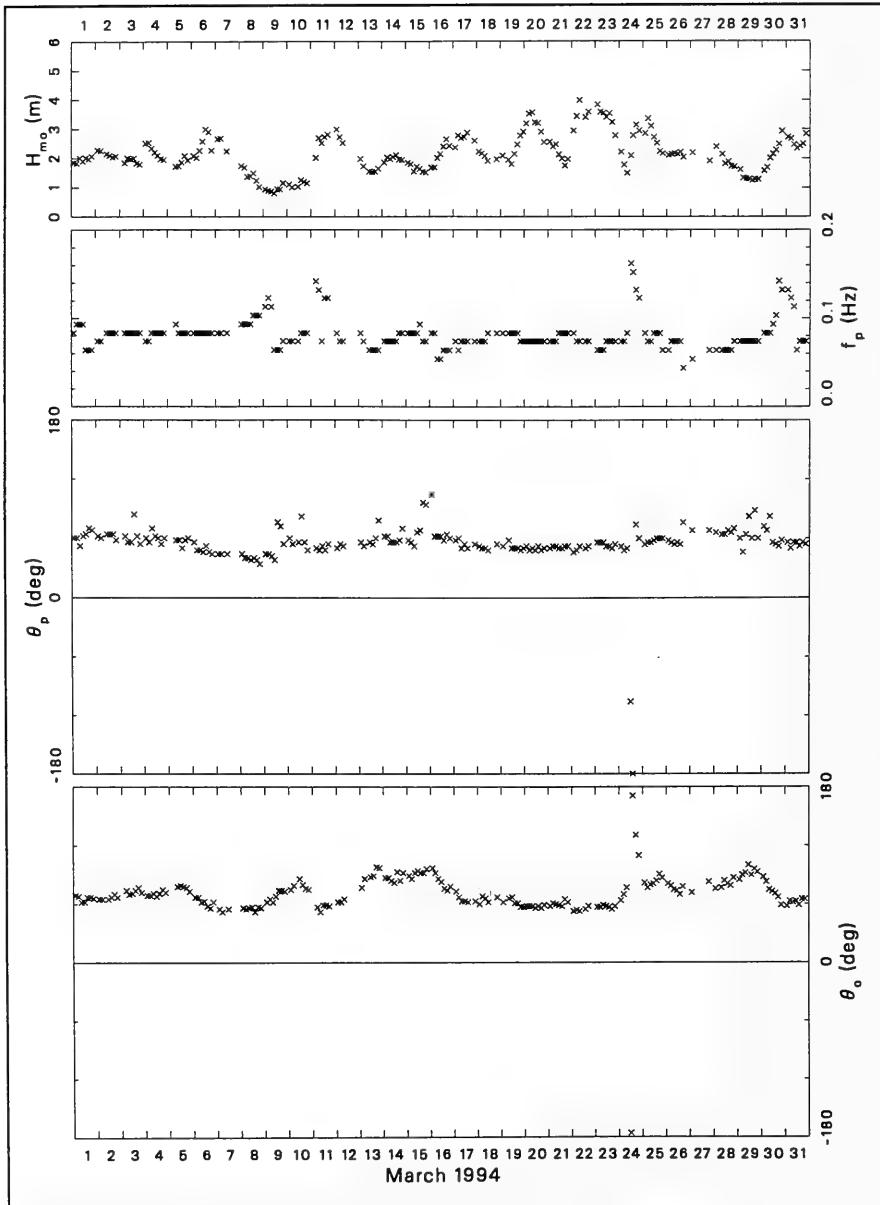
Figure B3. Bulk data for March 1994 (Continued)
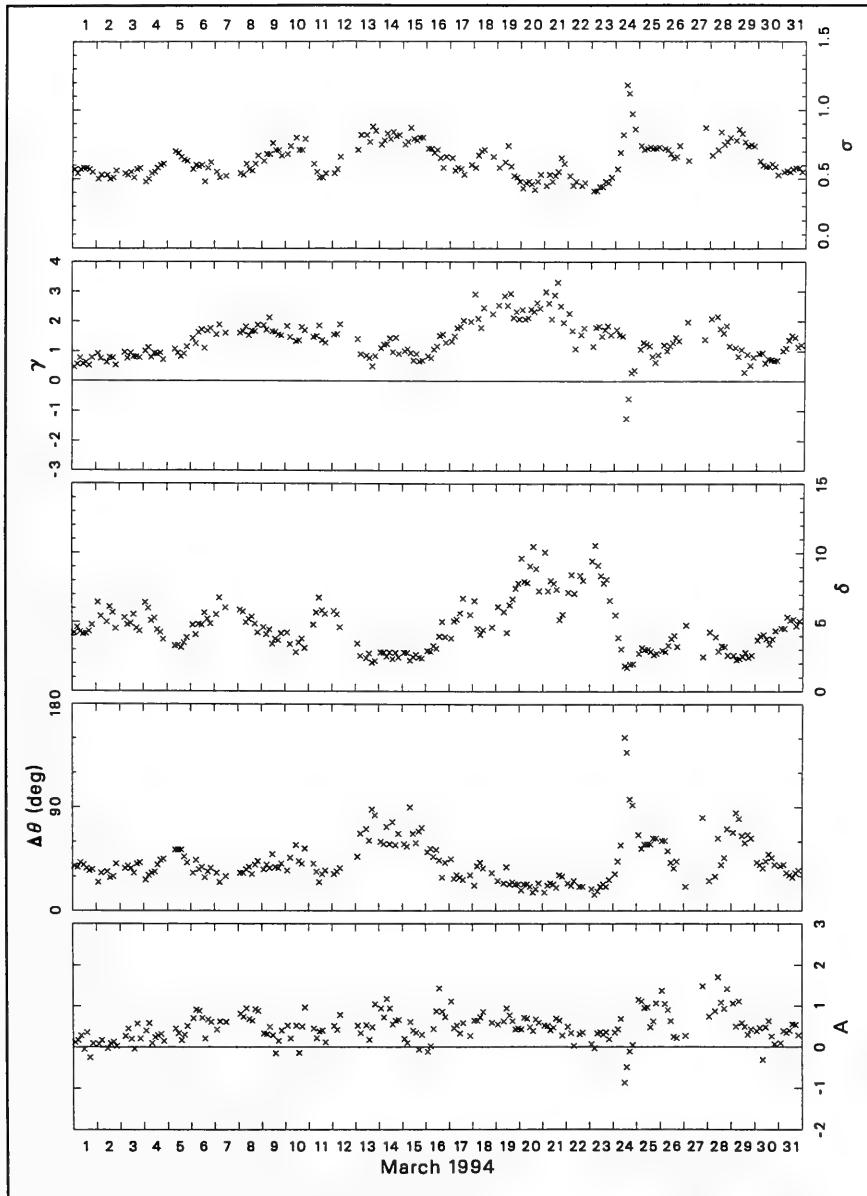
Figure B3. (Concluded)
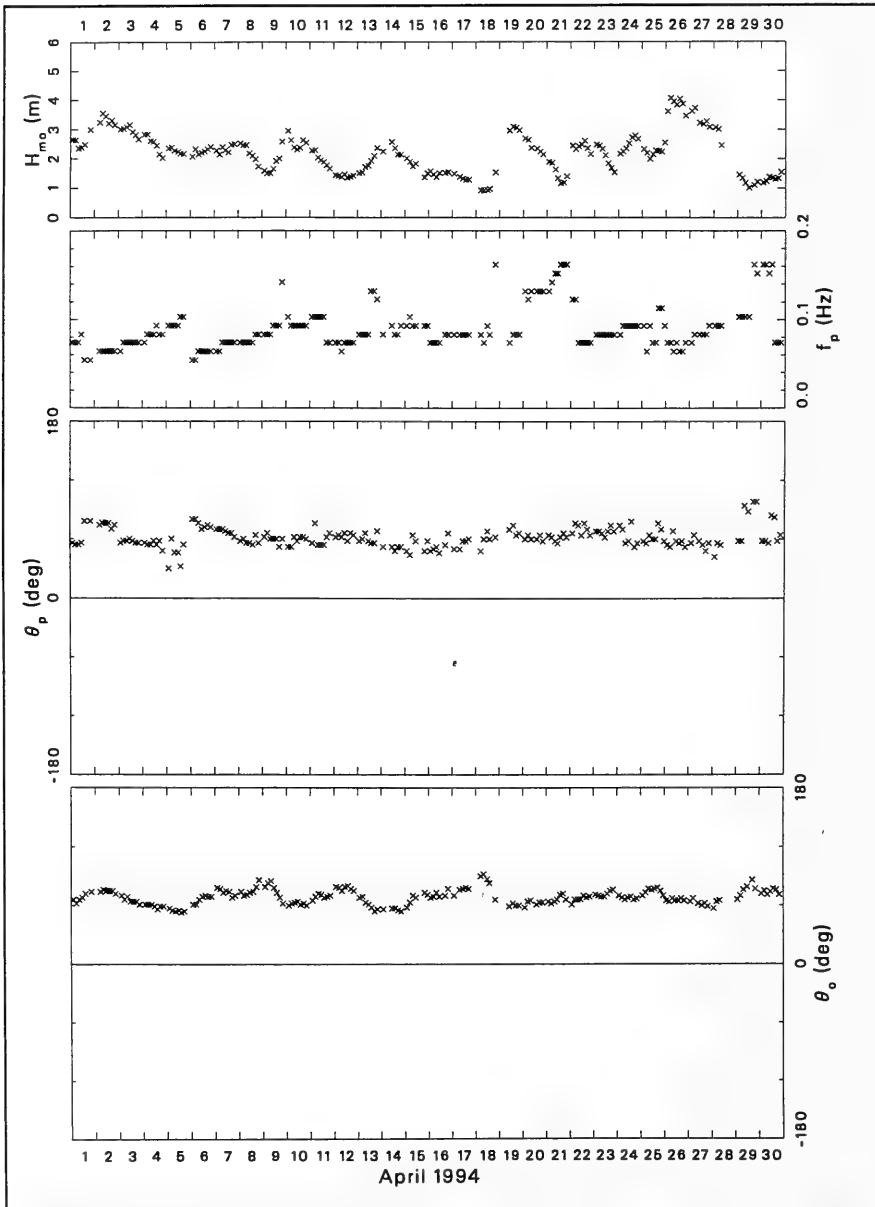
Figure B4. Bulk data for April 1994 (Continued)
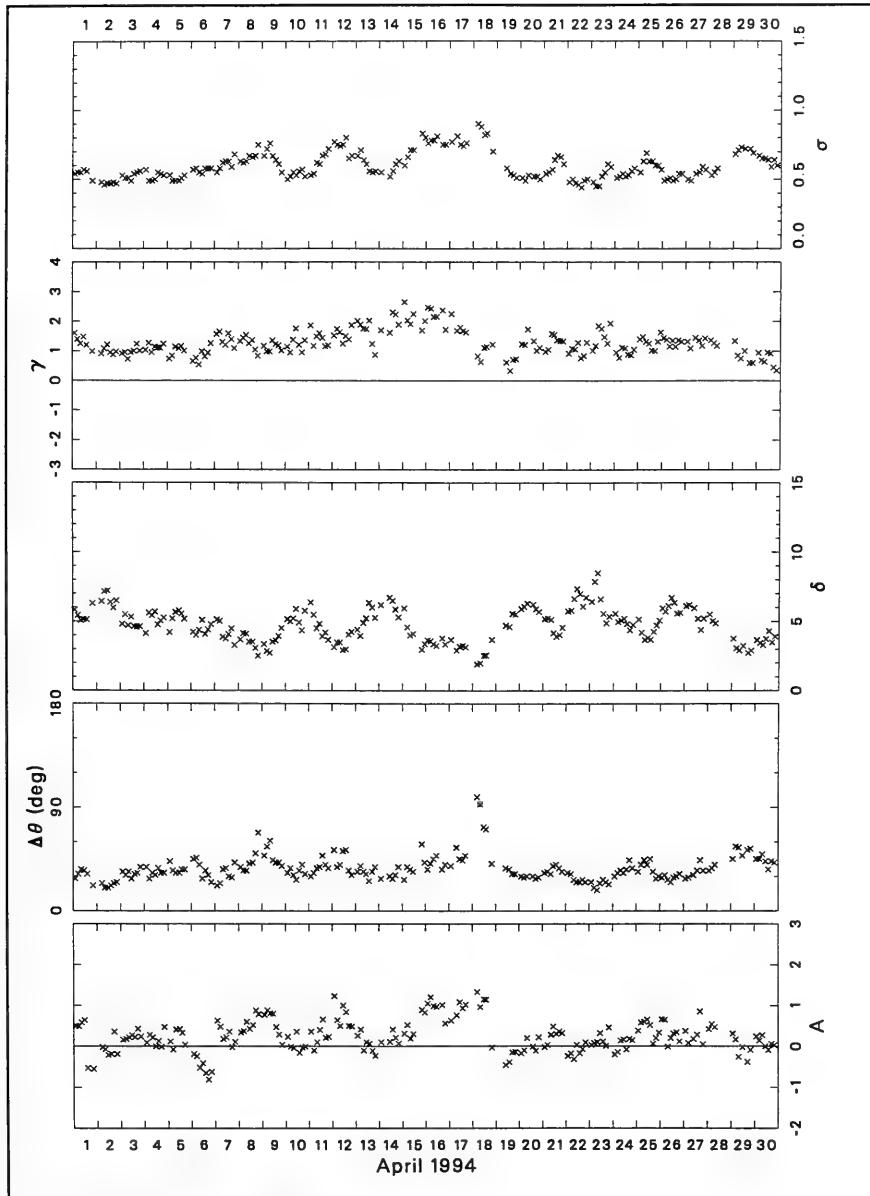
Figure B4. (Concluded)
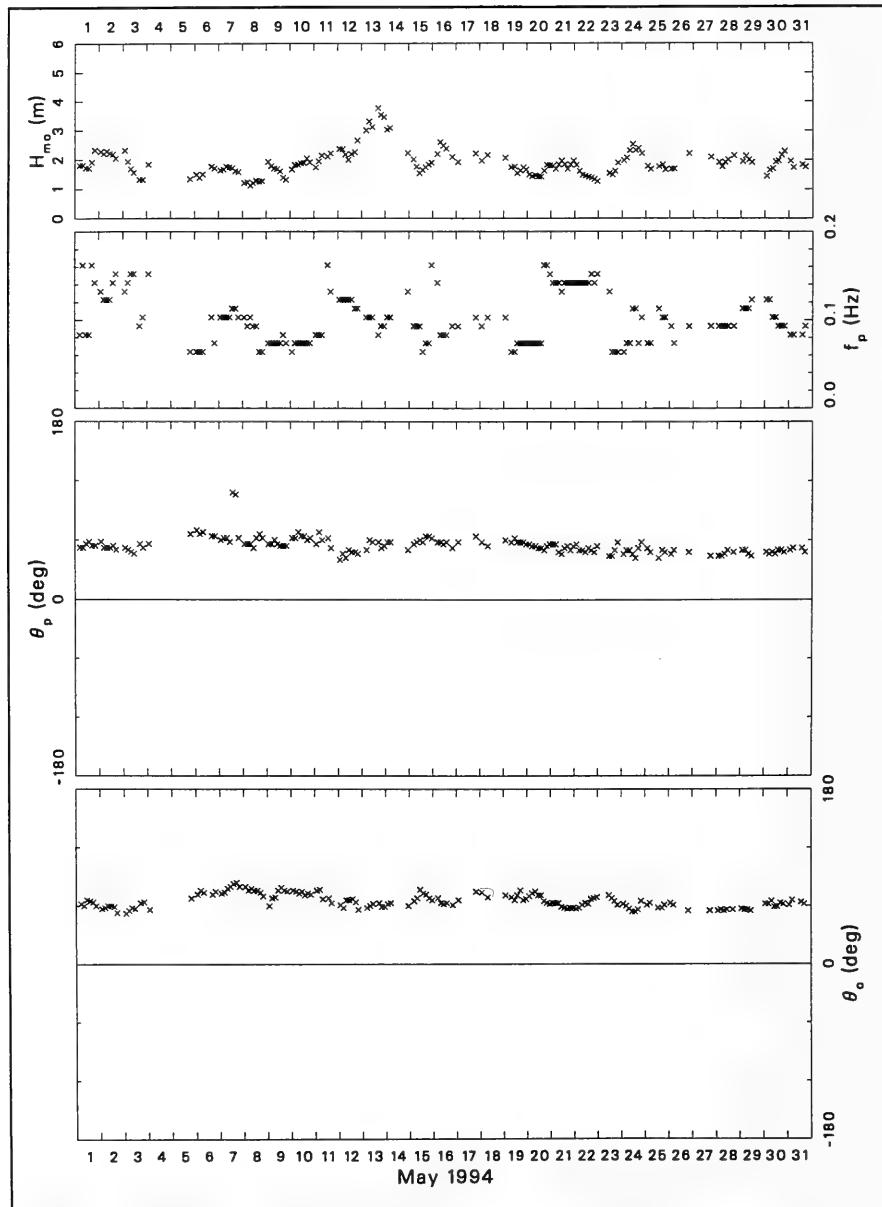
Figure B5. Bulk data for May 1994 (Continued)
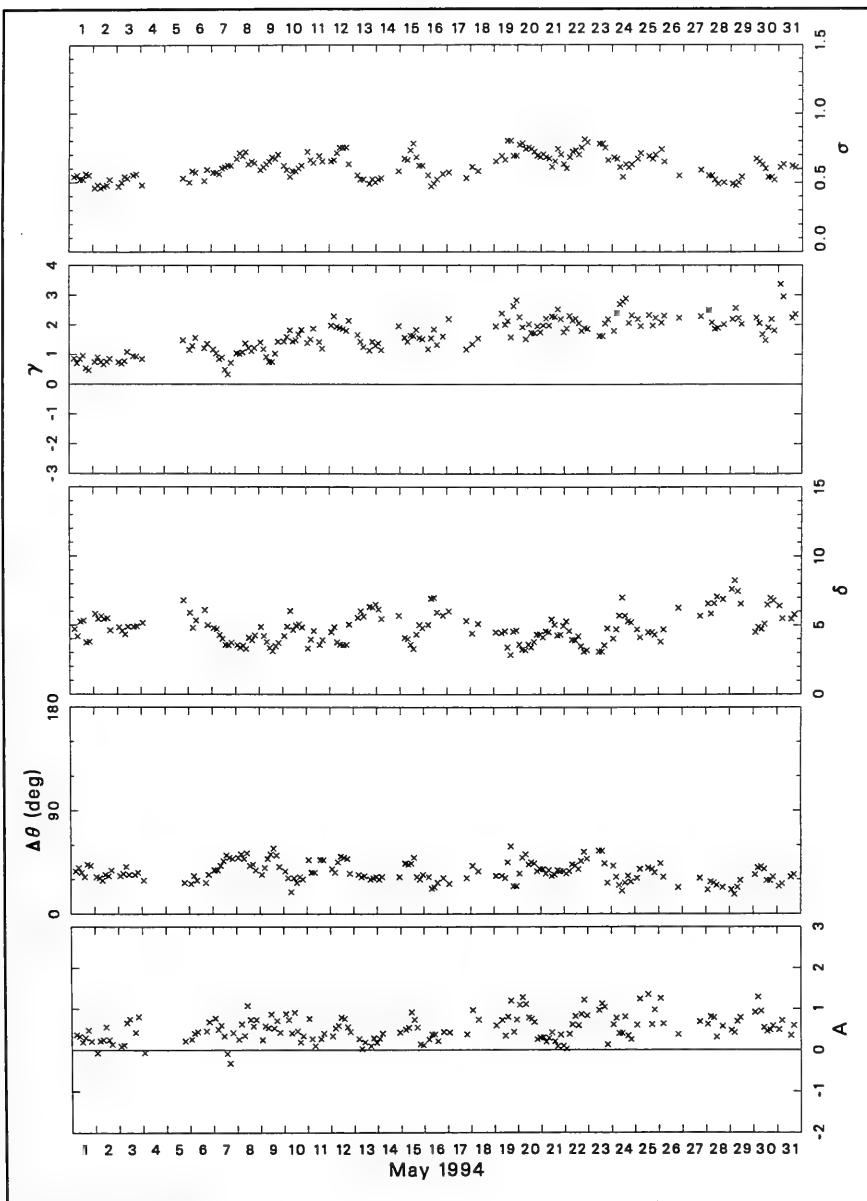
Figure B5. (Concluded)
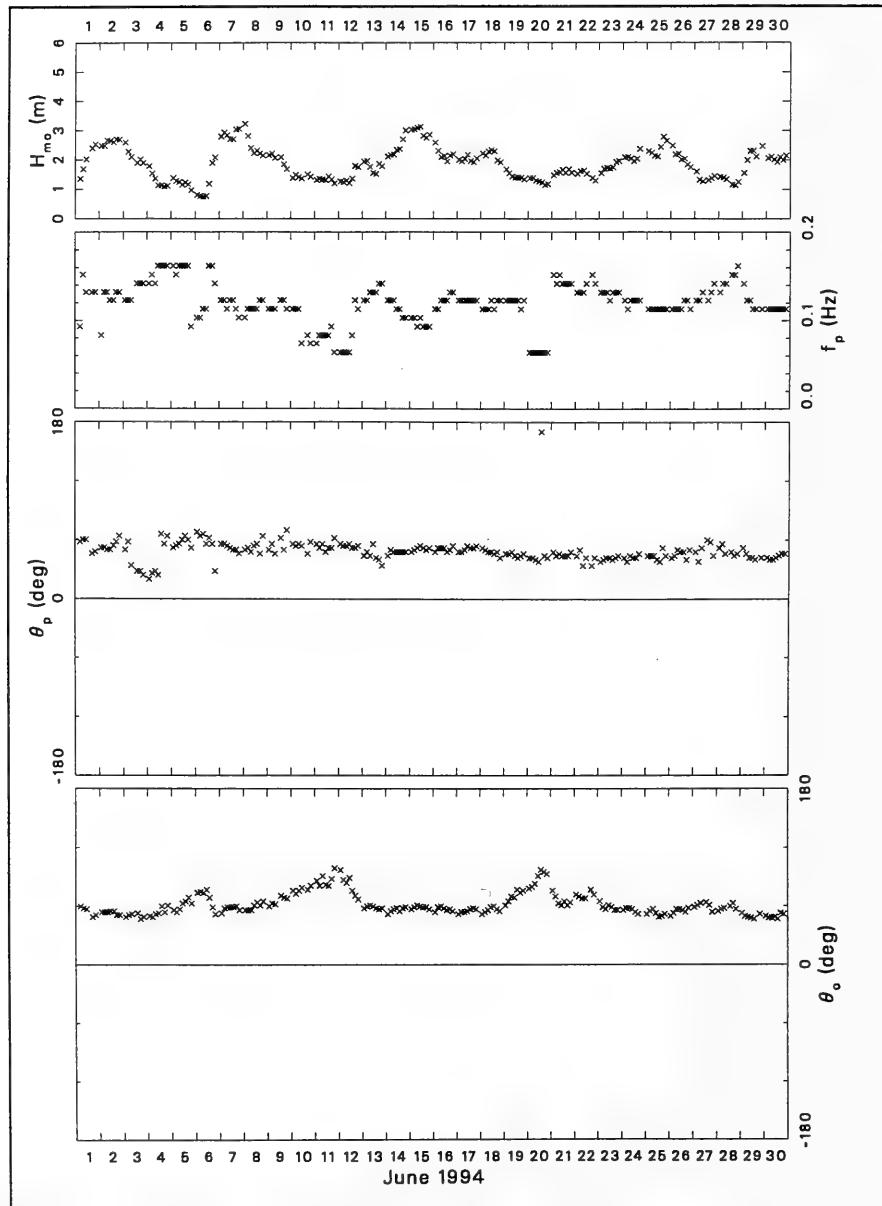
Figure B6. Bulk data for June 1994 (Continued)
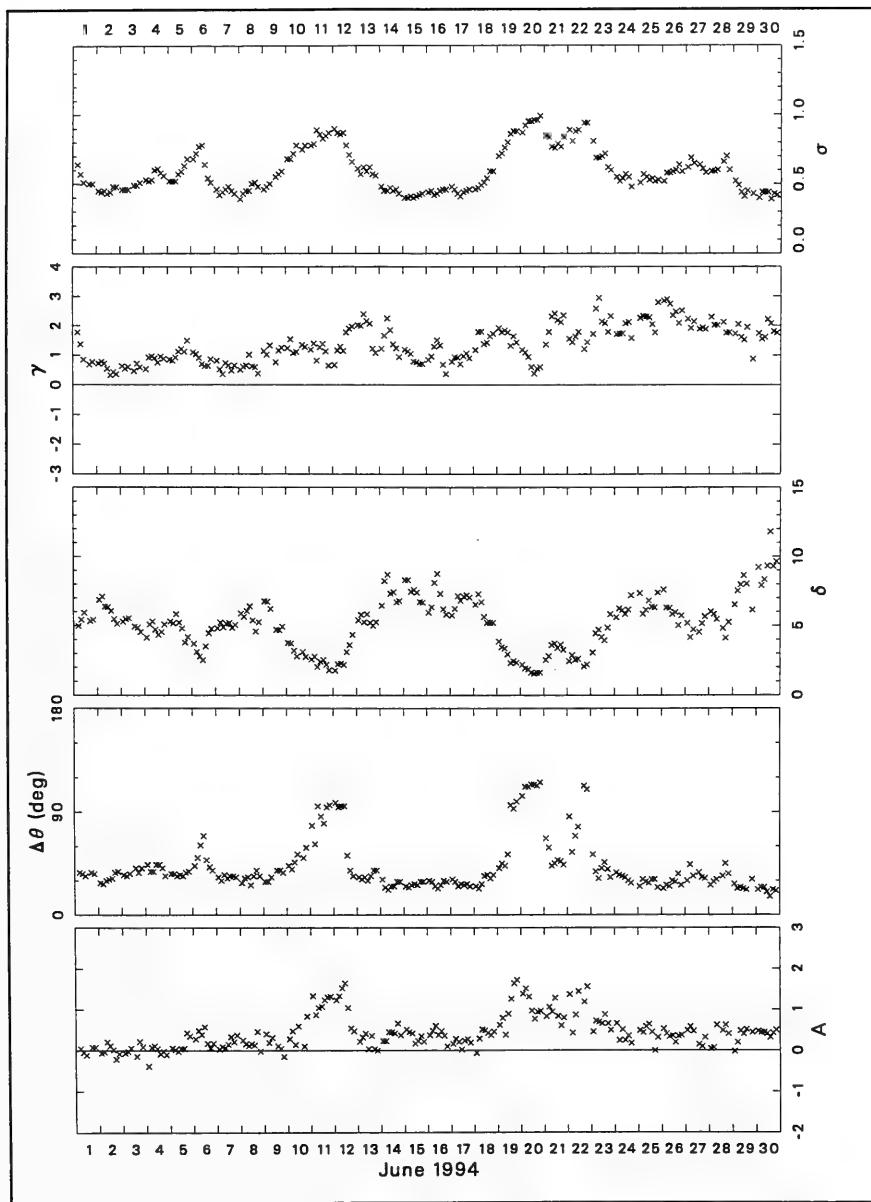
Figure B6. (Concluded)
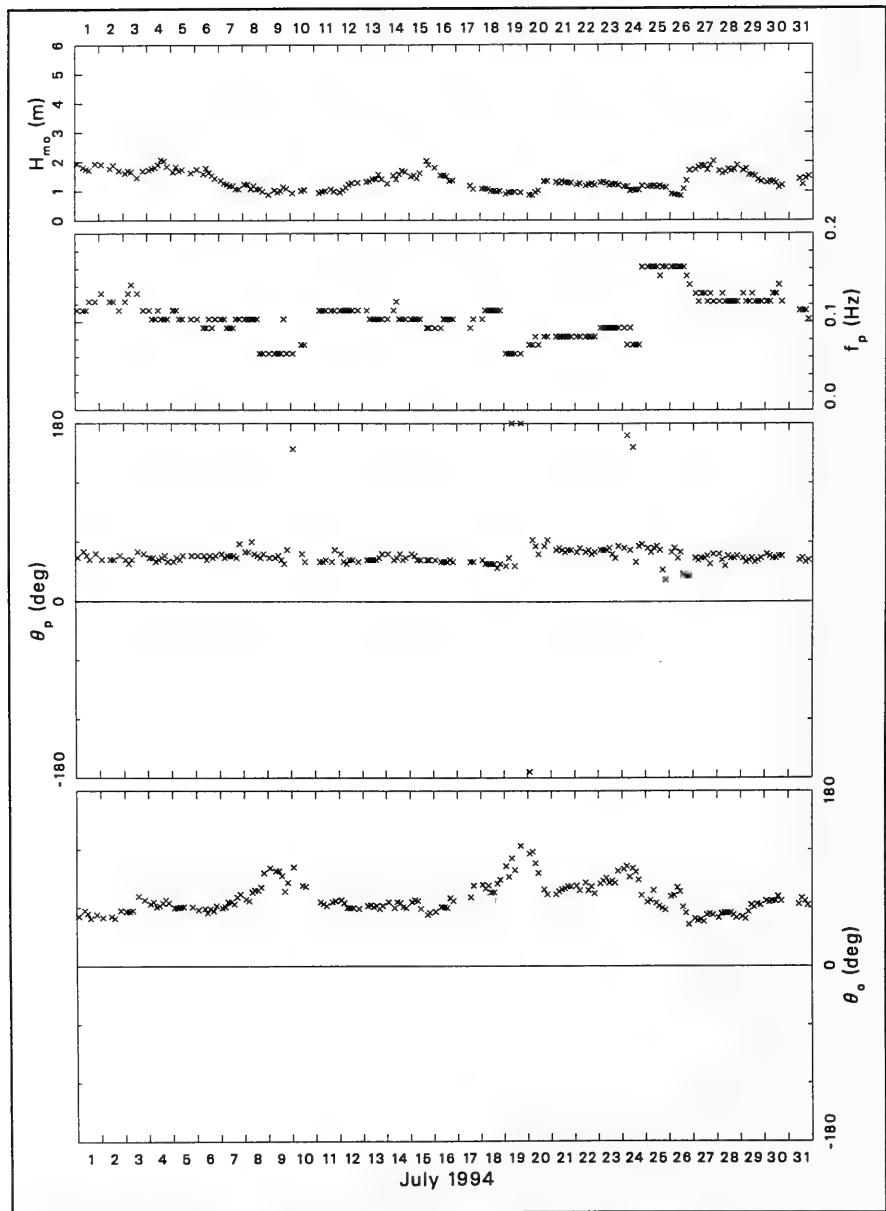
Figure B7. Bulk data for July 1994 (Continued)
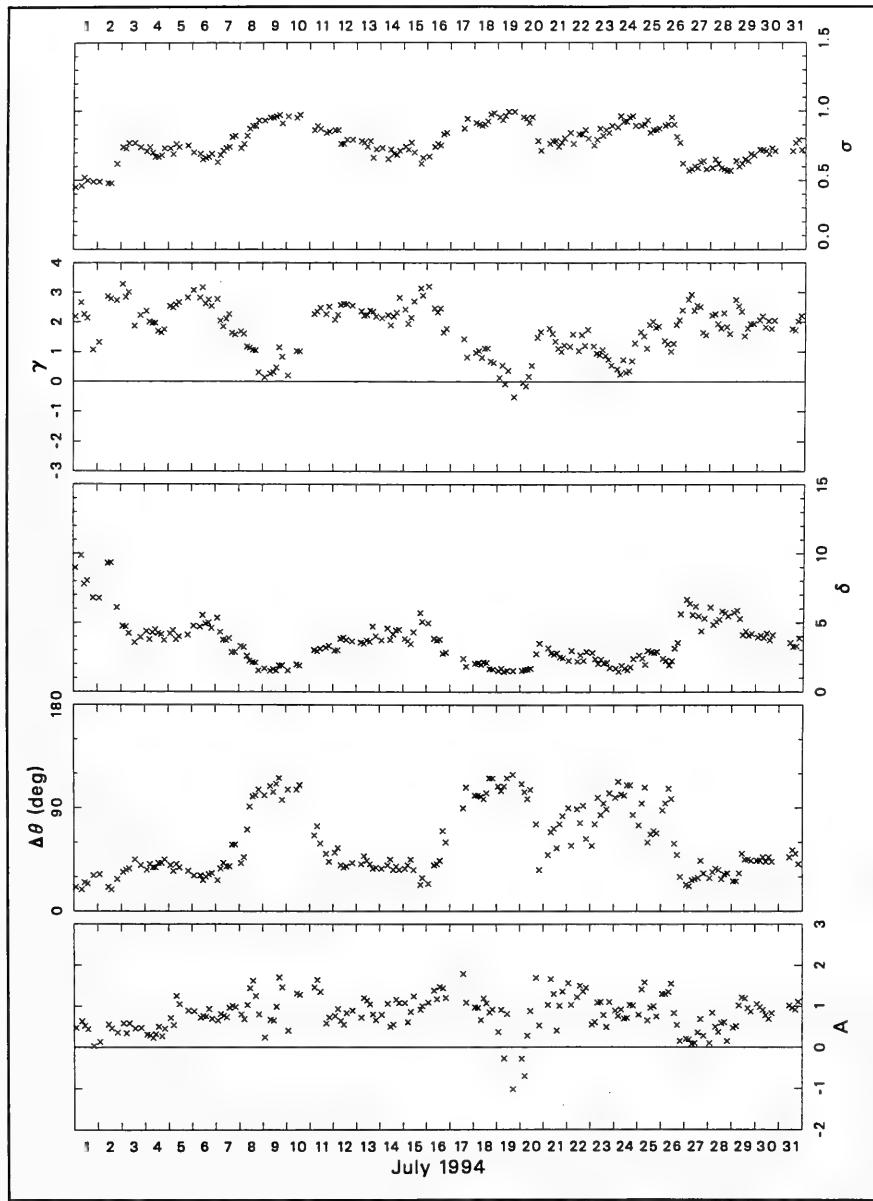
Figure B7. (Concluded)
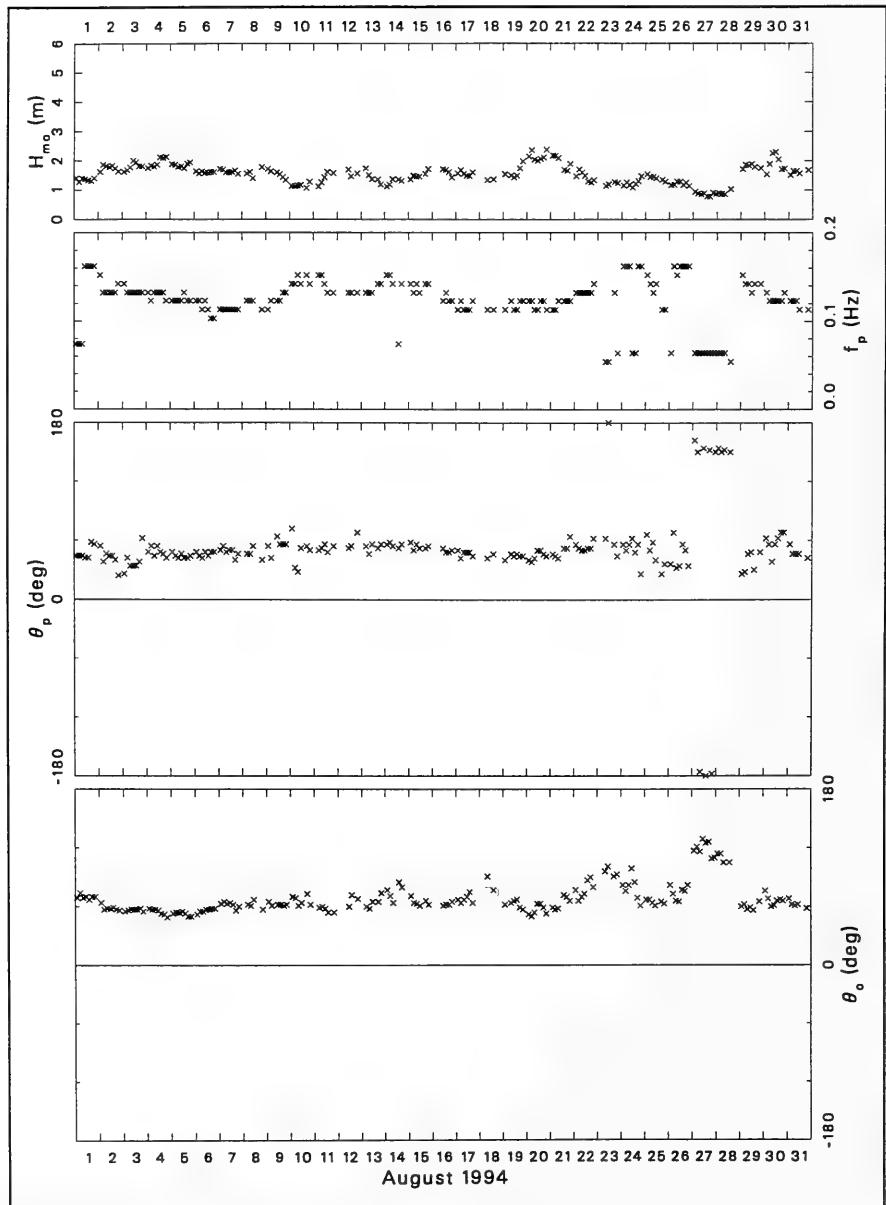
Figure B8. Bulk data for August 1994 (Continued)
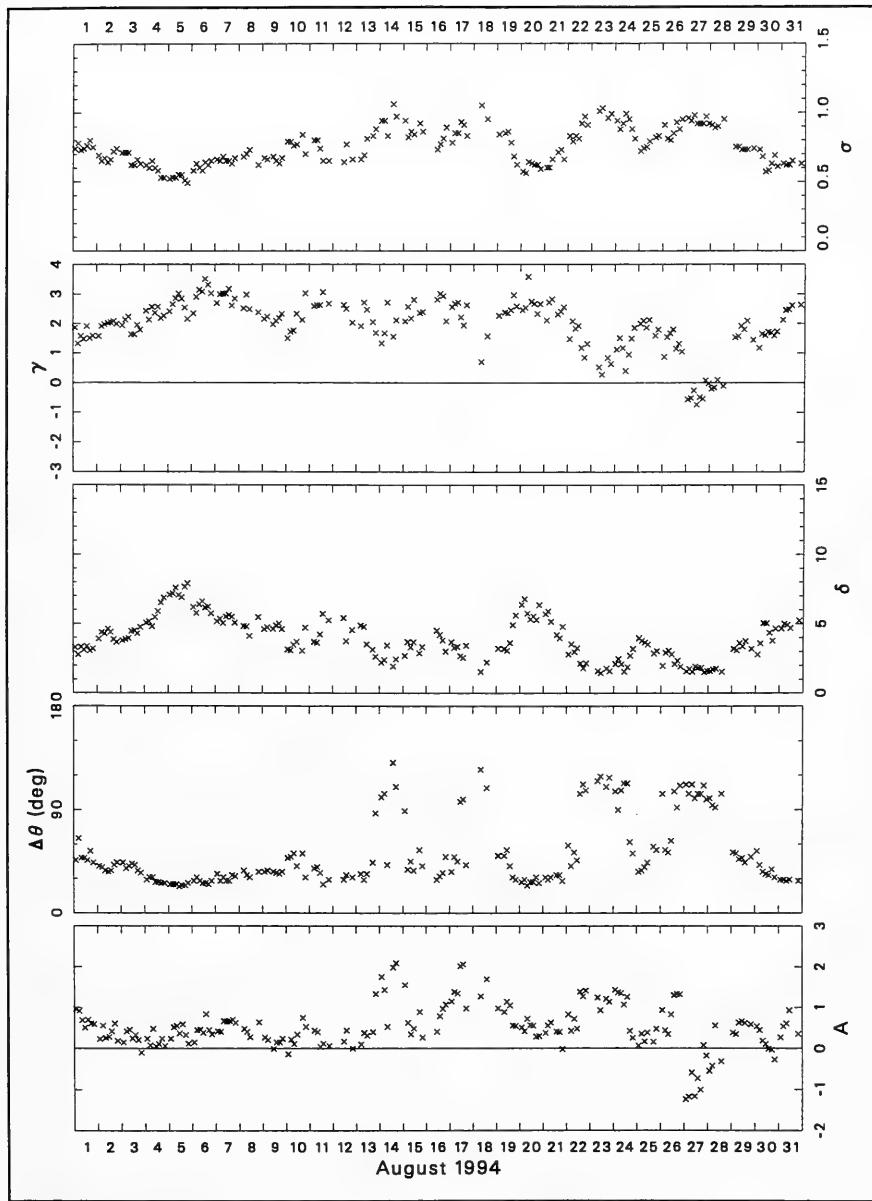
Figure B8. (Concluded)
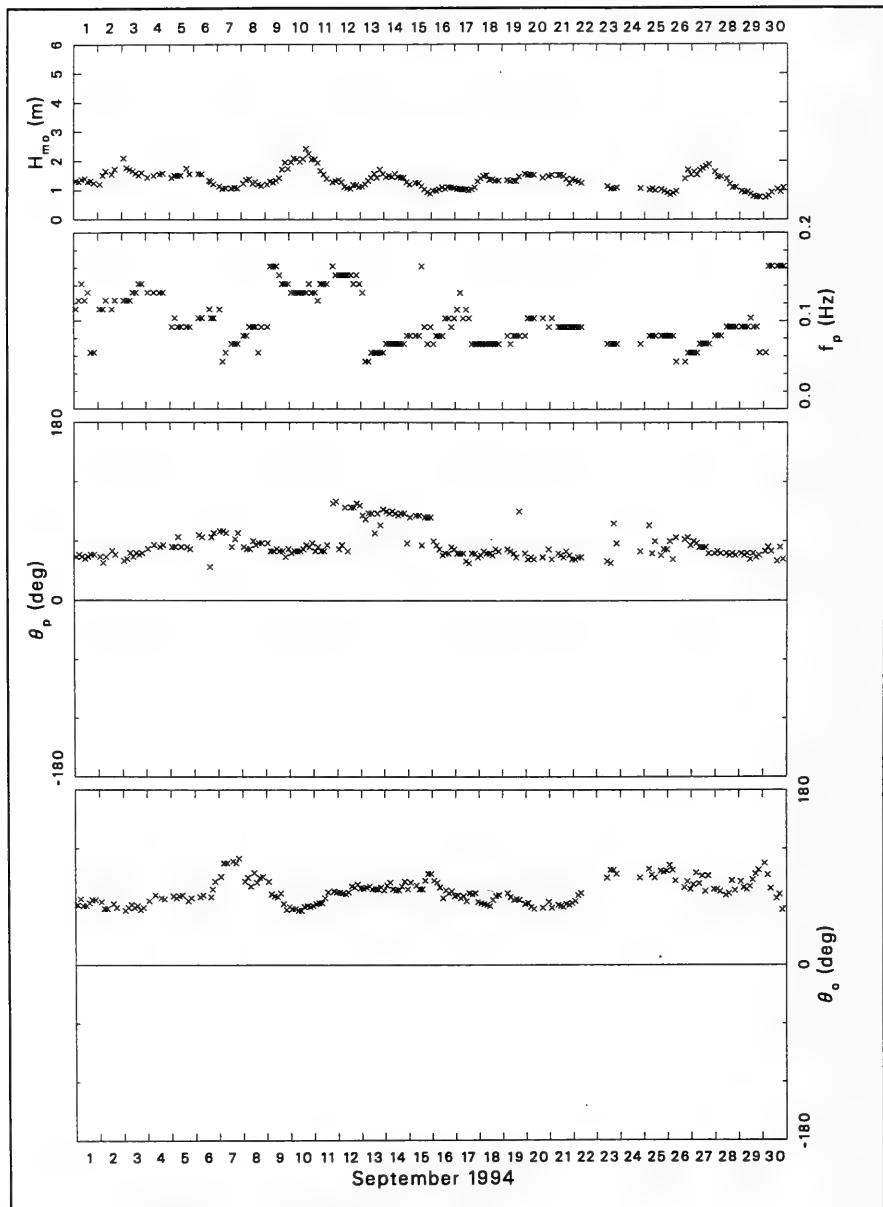
Figure B9. Bulk data for September 1994 (Continued)
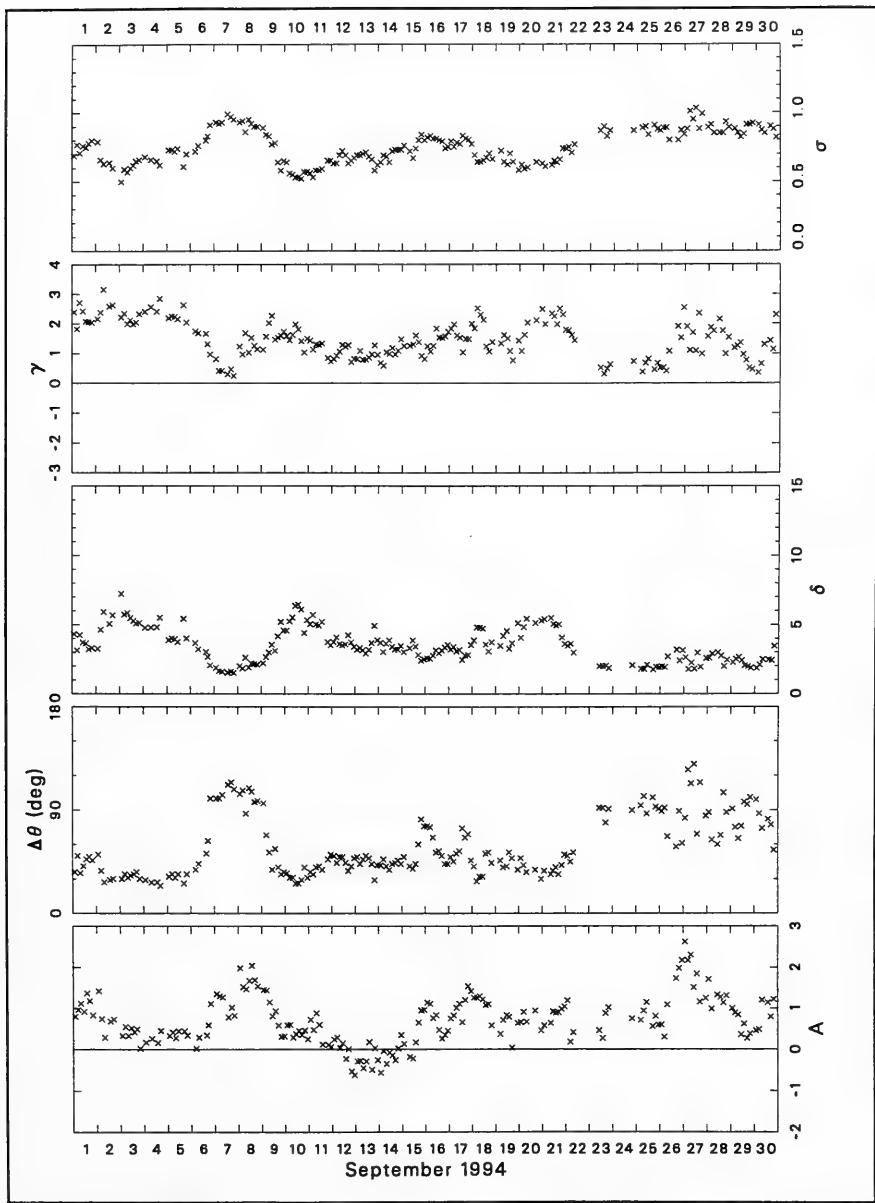
Figure B9. (Concluded)
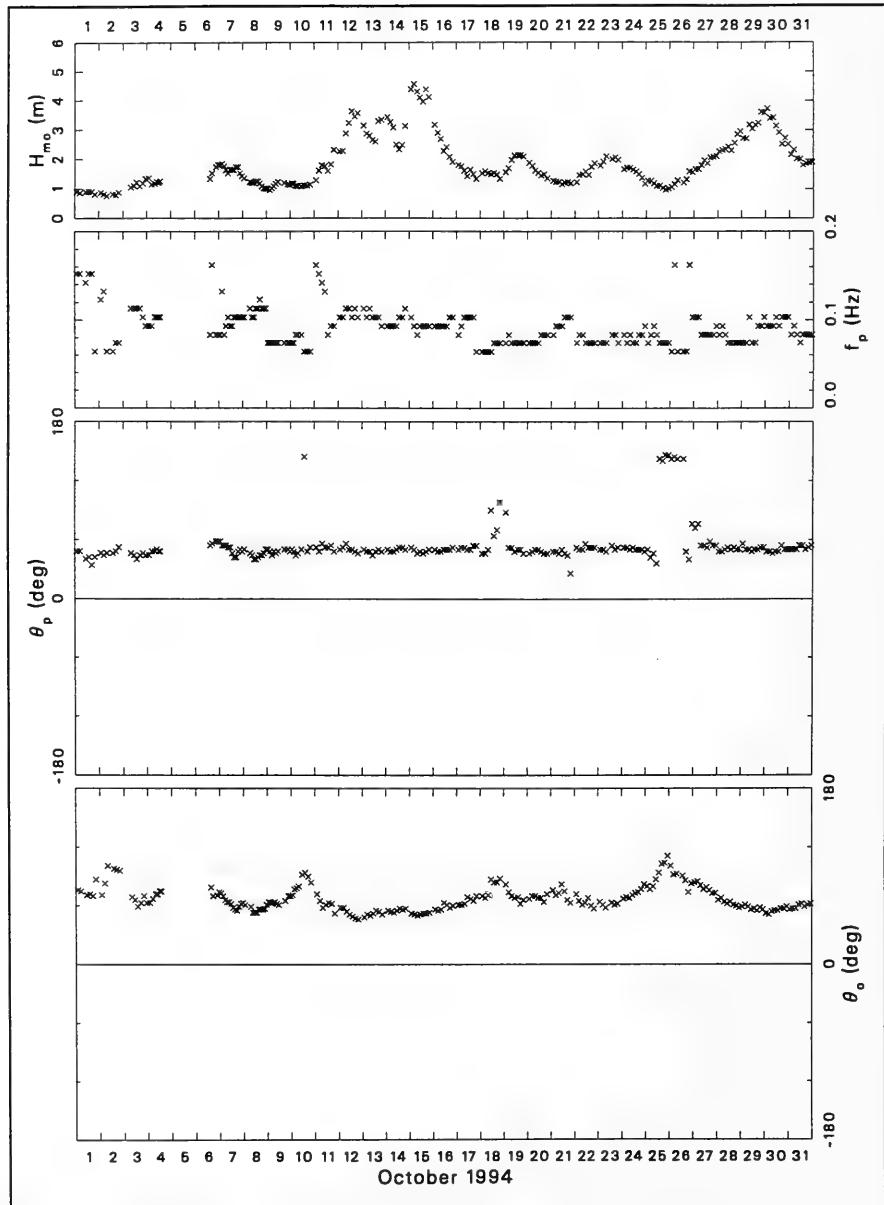
Figure B10. Bulk data for October 1994 (Continued)
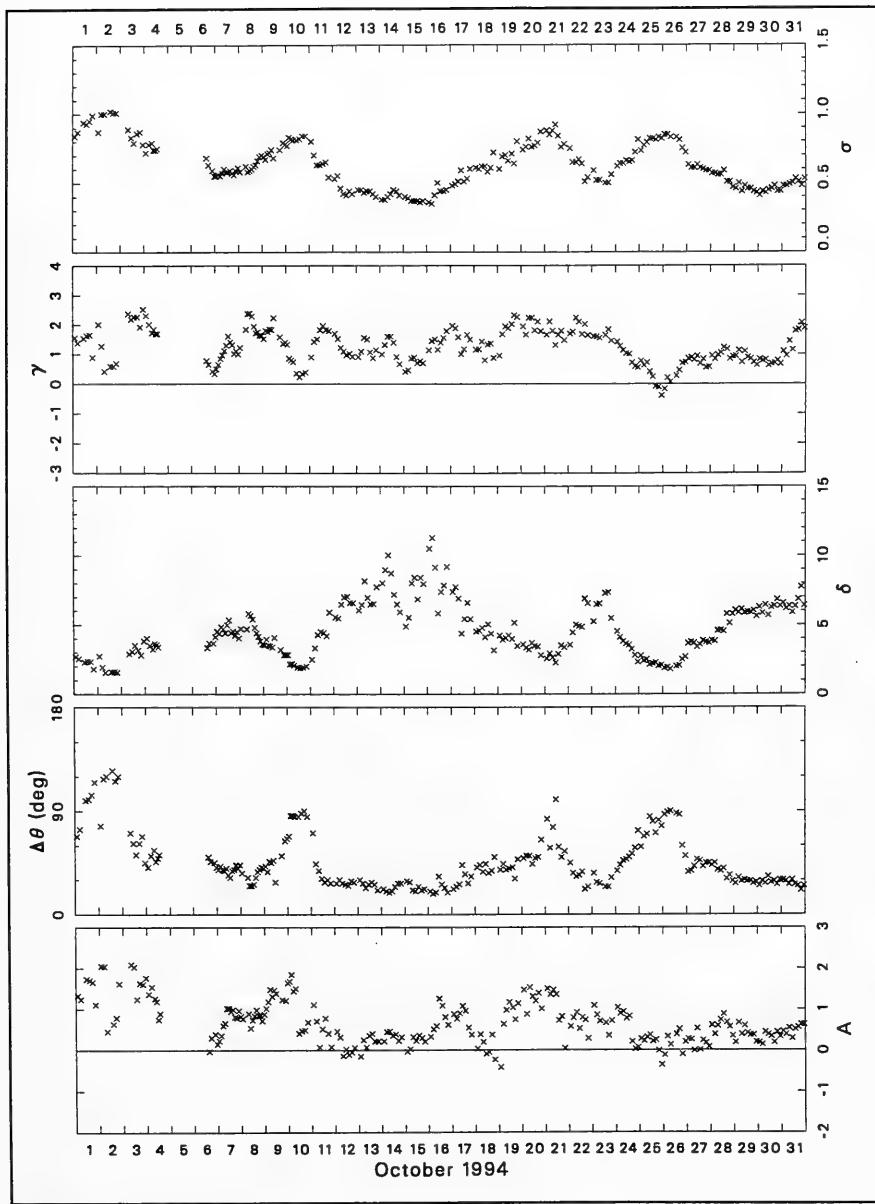
Figure B10. (Concluded)
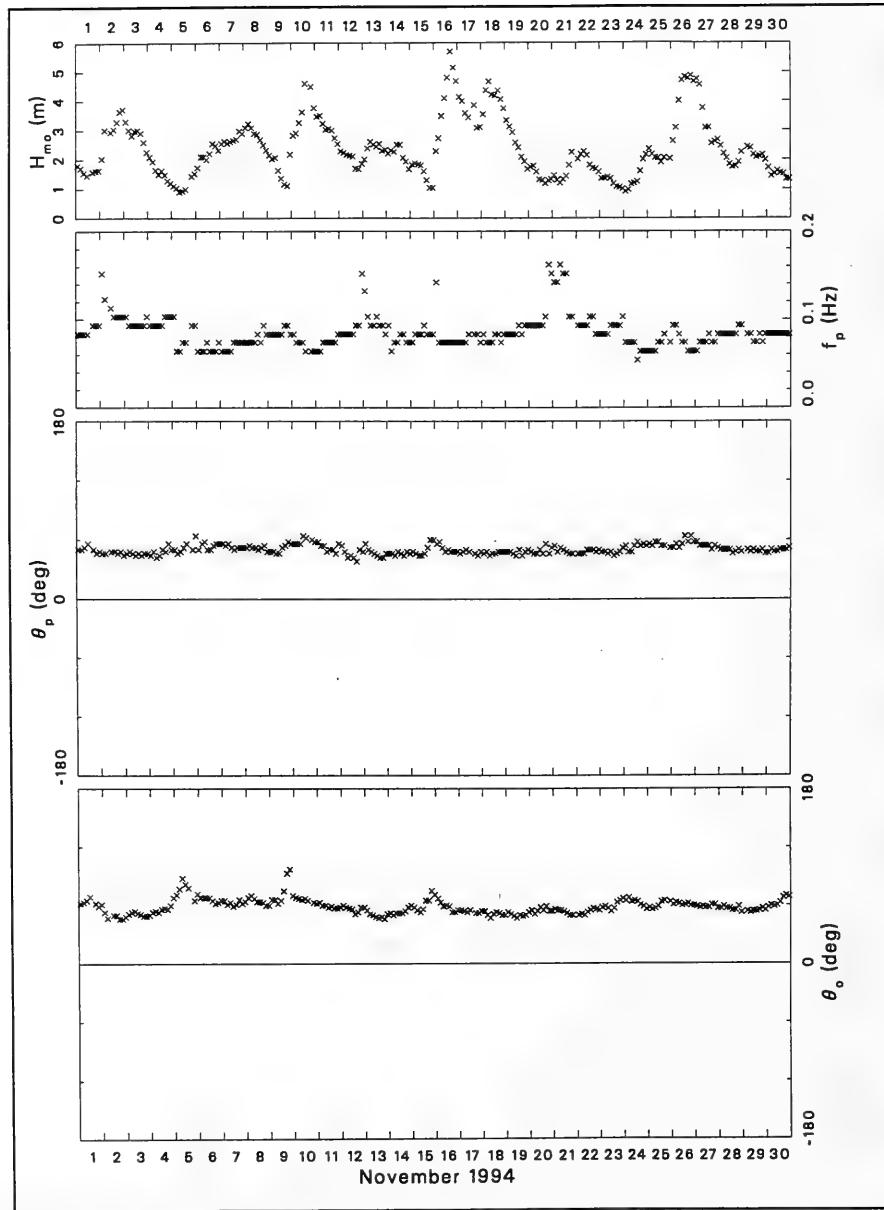
Figure B11. Bulk data for November 1994 (Continued)
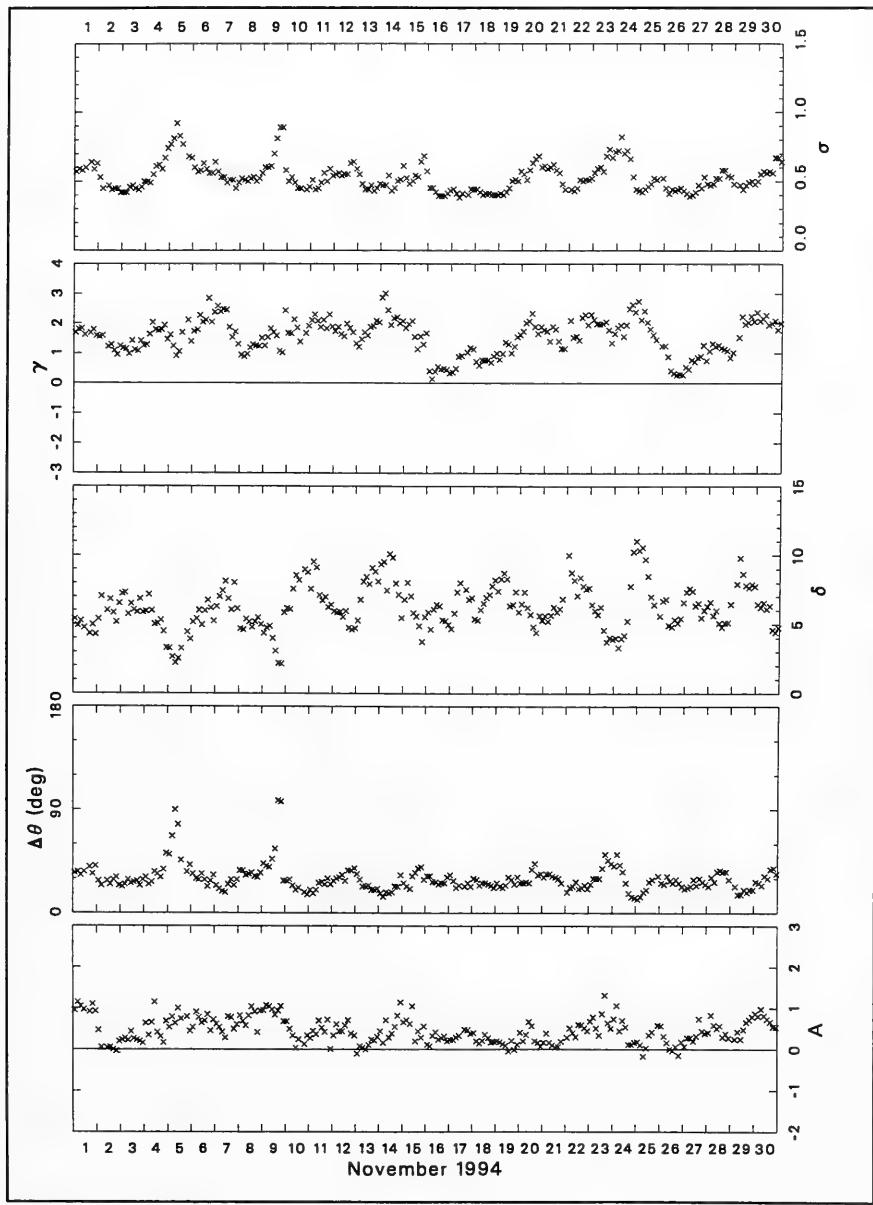
Figure B11. (Concluded)
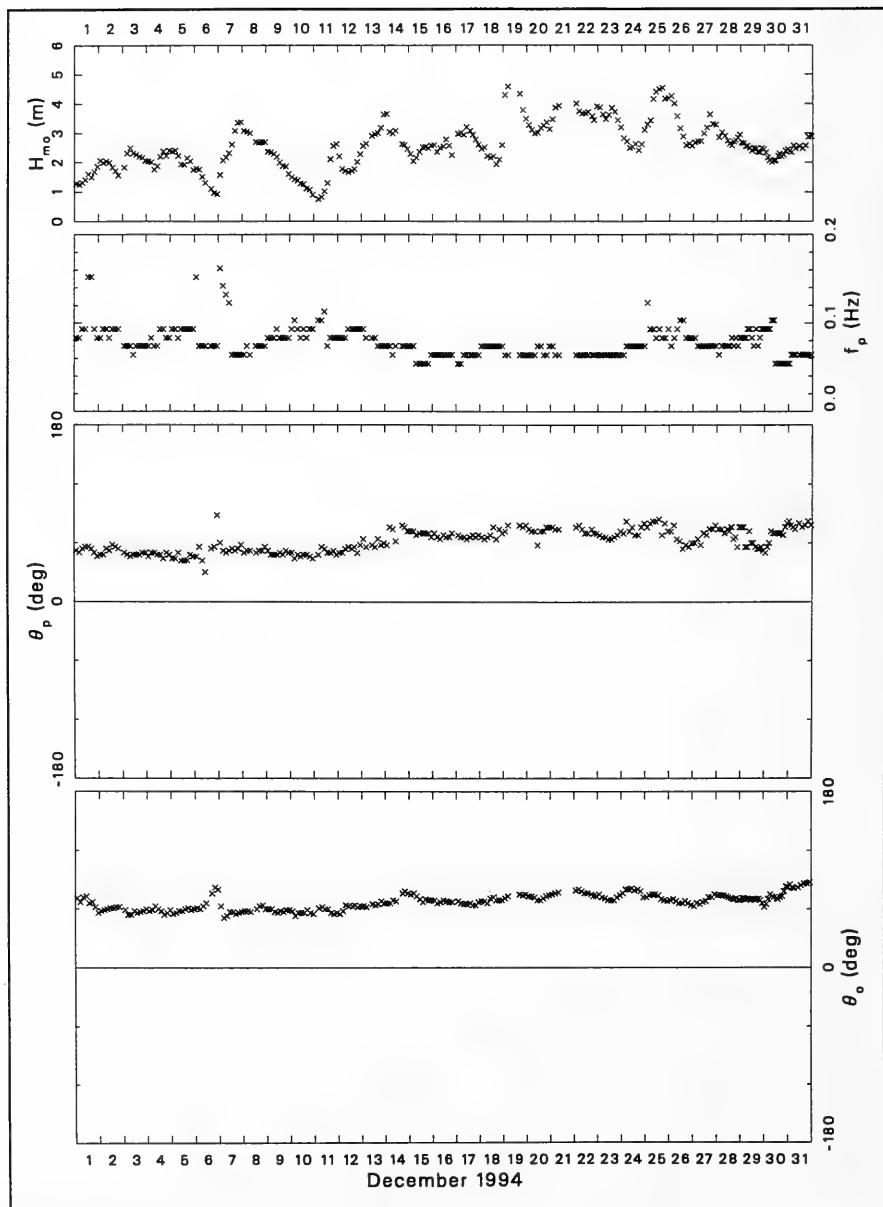
Figure B12. Bulk data for December 1994 (Continued)
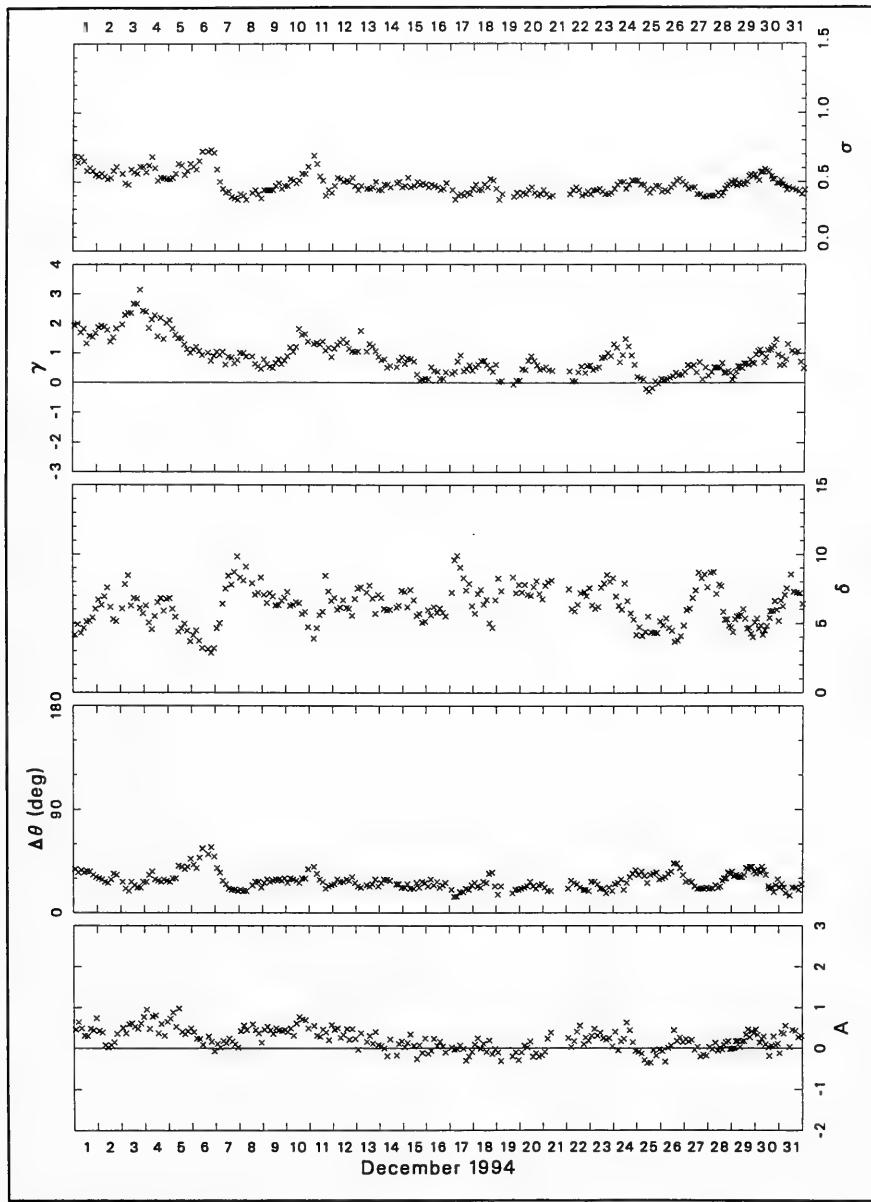
Figure B12. (Concluded)

Appendix C
Listing of FORTRAN Computer Program

```fortran
      program readascii
c
c Sample FORTRAN program containing statements necessary to read
c ASCII files of Harvest Platform frequency-direction spectra.
c This example reads a file called HPyymmddhhmm.ASC, where the
c string yymmddhhmm is a date/time group entered by the user.
c In other applications, the I/O statements may need modification
c to suit a user's system.
c
c Variable names, units and meanings are:
c
c====================================================================
c
c      f(nf)..[Hz] frequency at index nf
c angle(na)..[degrees CCW from true north] direction at index na from
c              which wave energy is arriving
c     sf(nf)..[m^2/Hz] frequency spectral density at f(nf)
c
c ddf(nf,na)..[deg^(-1)] directional distribution function at f(nf)
c              and angle(na), which is the frequency-direction
c              spectral density at f(nf) and angle(na) normalized by
c              sf(nf)
c fds(nf,na)..[m^2/(Hz*deg)] frequency-direction spectrum at f(nf)
c              and angle(na), computed from ddf(nf,na) and sf(nf)
c
c   gpat(nf)..gauge pattern used at f(nf)
c   iter(nf)..# of IMLE iterations for convergence at f(nf)
c   datetime..[character*10] Date and Greenwich Mean Time of
c              beginning of data collection in the order year,
c              month, day, hour, minute, and in the form
c              yymmddhhmm (2-digit year, no blanks in any field)
c
c       Hmo..[m] Energy-based characteristic wave height equal
c              to 4*sigma, where sigma^2 is the variance of sea
c              surface displacement
c        fp..[Hz] frequency at peak of frequency spectrum
c       thp..[deg] direction at peak of directional distribution
c              at f(nf) = fp
c
c    ifimle..algorithm flag: [1]=IMLE estimate, [0]=MLE estimate
c     istot..[sec] duration of data collection
c      sfrq..[Hz] data sampling frequency
```

Figure C1. Listing of FORTRAN Computer Program (Sheet 1 of 3)

```
c     ifwindo..windowing flag: [0]=no windowing of data segments,
c              [1]=segments windowed (Kaiser-Bessel window)
c     ifdtrnd..detrending flag: [0]=no detrending, [1]=linear trend
c              removed from data segments
c       nfft..# of points in each data ensemble
c      nensb..# of half-lapped segments of cross-spectral computations
c      nband..# of raw frequency bands averaged in frequency smoothing
c      idgfr..degrees of freedom in cross-spectral computations
c              (based on contiguous segments only)
c
c       nfrq..number of output frequency bands, equals range of index
c              nf
c      delfs..[Hz] output frequency bandwidth
c       nang..number of output angle bins, equals range of index na
c     delang..[deg] output angle bin width
c
c       dmin..[m] minimum ensemble segment water depth at reference
c              gauge 'rname' during collection
c       dbar..[m] mean water depth at gauge 'rname' during collection
c       dmax..[m] maximum ensemble segment water depth at reference
c              gauge 'rname' during collection
c      rname..[character*5] reference gauge id for depth computations
c
c=====================================================================
c
      character*5           rname
      character*6           gpat(13)
      character*10          indattim,       datetime
      character*80          infile
      dimension             f(13),        sf(13),     iter(13)
      dimension         angle(181),  ddf(13,181),  fds(13,181)
c
c get file-naming date/time group from user
c
      write(*,'(2x,''Enter date/time group (yymmddhhmm)...'')')
      read(*,'(a10)') indattim                      !date/time string
c
c define input data file
c
      infile='HP'//indattim(1:10)//'.ASC'
c
c open, read, and close data file
c
      open(10,file=infile,status='old',form='formatted')
c
      read(10,
     & '(   a10,   f10.2,   f10.5,   f10.1,    i10,    i10,
     &    f10.5,    i10,/,   i10,    i10,     i10,    i10,
     &      i10,    i10,   f10.5,   i10,/, f10.1,  f10.2,
     &    f10.2,  f10.2,    5x,a5)')
     & datetime,    Hmo,     fp,     thp, ifimle, istot,
     &     sfrq, ifwindo, ifdtrnd,  nfft,  nensb,  nband,
     &    idgfr,   nfrq,   delfs,   nang, delang,   dmin,
     &     dbar,   dmax,   rname
c
      read(10,'(10f8.1)') (angle(na),na=1,nang)
c
      do 10 nf=1,nfrq
         read(10,
     &   '(  i10,   f10.5,   f10.6,    4x,a6,    i10)')
     &        if,   f(nf),  sf(nf),  gpat(nf), iter(nf)
         read(10,'(8f10.7)') (ddf(nf,na),na=1,nang)
10    continue
c
      close(10)
```

Figure C1. (Sheet 2 of 3)

```
c
c   compute frequency-direction spectrum fds(nf,na) from ddf(nf,na)
c   and sf(nf)
c
      do 20 nf=1,nfrq
        do 25 na=1,nang
          fds(nf,na)=sf(nf)*ddf(nf,na)
25      continue
20    continue
c
c   at this point, all relevant variables are defined and arrays
c   are loaded;  subsequent computations or operations can be done
c   at the user's discretion...
c
      end
```

Figure C1. (Sheet 3 of 3)

Appendix D
Listing of Sample Data File

```
9406191702      1.40   0.11279     42.0        1     8192  1.00000          1
         0      1024        15       10      160       13  0.00977        181
       2.0    202.42    202.72   202.97    20201
    -180.0   -178.0   -176.0   -174.0   -172.0   -170.0   -168.0   -166.0   -164.0   -162.0
    -160.0   -158.0   -156.0   -154.0   -152.0   -150.0   -148.0   -146.0   -144.0   -142.0
    -140.0   -138.0   -136.0   -134.0   -132.0   -130.0   -128.0   -126.0   -124.0   -122.0
    -120.0   -118.0   -116.0   -114.0   -112.0   -110.0   -108.0   -106.0   -104.0   -102.0
    -100.0    -98.0    -96.0    -94.0    -92.0    -90.0    -88.0    -86.0    -84.0    -82.0
     -80.0    -78.0    -76.0    -74.0    -72.0    -70.0    -68.0    -66.0    -64.0    -62.0
     -60.0    -58.0    -56.0    -54.0    -52.0    -50.0    -48.0    -46.0    -44.0    -42.0
     -40.0    -38.0    -36.0    -34.0    -32.0    -30.0    -28.0    -26.0    -24.0    -22.0
     -20.0    -18.0    -16.0    -14.0    -12.0    -10.0     -8.0     -6.0     -4.0     -2.0
       0.0      2.0      4.0      6.0      8.0     10.0     12.0     14.0     16.0     18.0
      20.0     22.0     24.0     26.0     28.0     30.0     32.0     34.0     36.0     38.0
      40.0     42.0     44.0     46.0     48.0     50.0     52.0     54.0     56.0     58.0
      60.0     62.0     64.0     66.0     68.0     70.0     72.0     74.0     76.0     78.0
      80.0     82.0     84.0     86.0     88.0     90.0     92.0     94.0     96.0     98.0
     100.0    102.0    104.0    106.0    108.0    110.0    112.0    114.0    116.0    118.0
     120.0    122.0    124.0    126.0    128.0    130.0    132.0    134.0    136.0    138.0
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Figure D1. Listing of sample data file (Sheet 1 of 6)

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Figure D1. (Sheet 2 of 6)

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Figure D1. (Sheet 3 of 6)

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```

Figure D1. (Sheet 4 of 6)

```
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Figure D1. (Sheet 5 of 6)

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0.0000626 0.0000606 0.0000585 0.0000565 0.0000546 0.0000529 0.0000514 0.0000502
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0.0000837 0.0000880 0.0000932 0.0000993 0.0001044
```

Figure D1. (Sheet 6 of 6)

Appendix E
Notation

Text	Appendix C	
a_0		Normalizing coefficient in maximum likelihood estimate (MLE)
a_r		Normalizing coefficient for r^{th} iteration in iterative maximum likelihood estimator (IMLE)
A		Quartile asymmetry parameter
	angle(na)	Element na of an array that represents direction coordinates
$C_{ij}(f_n)$		Coincident spectral density between gauges i and j at frequency f_n
d		Water depth
	datetime	Ten-character string that contains date and time
	dbar	Mean water depth
	ddf(nf,na)	Array element representing the directional distribution function at frequency f(nf) and direction angle(na)
$d\theta$	delang	Direction increment
df	delfs	Frequency increment
	dmax	Maximum segment-averaged water depth in a collection

Text	Appendix C	
	dmin	Minimum segment-averaged water depth in a collection
$D(\theta_m)$		Directional distribution function based on $S(\theta_m)$
$D(f_n, \theta_m)$		Directional distribution function at frequency f_n and direction θ_m
$D_0(f_n, \theta_m)$		MLE estimate of directional distribution function at frequency f_n
$D_r(f_n, \theta_m)$		IMLE estimate of directional distribution function at frequency f_n after r^{th} iteration
$D_r'(f_n, \theta_m)$		Intermediate, uncorrected IMLE estimate of directional distribution function at frequency f_n during r^{th} iteration
$\hat{e}_x$		Unit vector in the x-direction
$\hat{e}_y$		Unit vector in the y-direction
	fds(nf,na)	Array element representing the frequency-direction spectrum at frequency f(nf) and direction angle(na)
f_n		n^{th} frequency of a set of N discrete frequencies
	f(nf)	Element nf of an array that represents frequency
f_p	fp	Peak frequency
g		Gravitational acceleration
	gpat(nf)	Element nf of an array of six-character strings that represent working gauge patterns
$hhmm$		Mnemonic for time of day
H_{mo}	Hmo	Characteristic wave height

Text	Appendix C	
	<u>Text</u>	<u>Appendix C</u>

i		Complex notation $\sqrt{-1}$ [in exponent or on main equation line]
		Gauge index [as subscript]
	idgfr	Degrees of freedom in cross-spectral estimation
	ifdtrnd	Flag indicating whether or not data have been detrended
	ifimle	Flag indicating if maximum likelihood or iterative maximum likelihood estimation is used
	ifwindo	Flag indicating whether or not data segments have been windowed
	istot	Total number of seconds duration of a time series
	iter(nf)	Number of iterative maximum likelihood iterations used to compute directional distribution at frequency f(nf)
I		Number of gauges in an array
$I(\theta_m - \theta_{m_{min}})$		Cumulative distribution function
$\text{Im}[\ ]$		Imaginary part of complex entity contained in brackets
j		Gauge index [as subscript]
k_n		Magnitude of wave number vector associated with n^{th} discrete frequency
$\vec{k}_n(\theta_m)$		Wave number vector for wave direction θ_m at n^{th} discrete frequency
l		Summation index
m	na	Index associated with discrete direction
m_1		First cosine moment of $D(\theta_m)$
m_2		Second cosine moment of $D(\theta_m)$

Text	Appendix C	
m_{min}		Index of discrete direction at which wave energy is minimum
M	nang	Integer number of discrete directions
$M_{ij}(f_n)$		Element of dimensionless matrix of cross spectra between gauges i and j at frequency f_n
$M_{ij}^{-1}(f_n)$		Element of inverse of $M_{ij}(f_n)$
${}^{r}M_{ij}(f_n)$		Estimate of element of dimensionless matrix of cross spectra between gauges i and j at frequency f_n during r^{th} IMLE iteration
${}^{r}M_{ij}^{-1}(f_n)$		Element of inverse of ${}^{r}M_{ij}(f_n)$
n	nf	Index associated with discrete frequency
n_1		First sine moment of $D(\theta_m)$
n_2		Second sine moment of $D(\theta_m)$
	nband	Number of frequency bands averaged in spectral estimation
	nensb	Number of segments into which a data record is divided during spectral estimation
	nfft	Number of data points in a data segment
N	nfrq	Integer number of discrete frequencies
$Q_{ij}(f_n)$		Quadrature spectral density between gauges i and j at frequency f_n
r		Iteration count for IMLE
	rname	Five-character string denoting reference gauge
R		Upper limit of IMLE iterations
Re[ ]		Real part of complex entity contained in brackets

Text	Appendix C	
	sf(nf)	Element nf of an array that represents the frequency spectrum
	sfrq	Sampling frequency
$S(f_n)$		Frequency spectral density at frequency f_n
$S(\theta_m)$		Direction spectral density at direction θ_m
$S(f_n,\theta_m)$		Frequency-direction spectral density at frequency f_n and direction θ_m
	thp	Peak direction of directional distribution at frequency fp
T_p		Peak period
x		Horizontal coordinate increasing northward
$\vec{x}_i$		Horizontal position vector of gauge i
$\vec{x}_j$		Horizontal position vector of gauge j
y		Horizontal coordinate increasing westward
$yymmdd$		Mnemonic for date
β		Exponential convergence rate parameter in IMLE
γ		Convergence rate coefficient in IMLE
		Circular skewness
$\Gamma^2_{ij}(f_n)$		Coherence of signals from gauges i and j at frequency f_n
δ		Circular kurtosis
$\Delta\theta$		Quartile directional spread parameter
ϵ_r		Convergence check parameter at r^{th} IMLE iteration

Text	Appendix C	
θ_0		Mean direction
$\theta_{25\%}$		First quartile direction of cumulative distribution function
$\theta_{50\%}$		Median direction of cumulative distribution function
$\theta_{75\%}$		Third quartile direction of cumulative distribution function
θ_l		l^{th} discrete direction
θ_m		m^{th} direction of a set of M discrete directions
$\theta_{m_{min}}$		Direction of minimum energy
θ_p		Peak direction
$\lambda_r(f_n, \theta_m)$		IMLE correction factor at the rth iteration
σ		Circular width parameter
$\phi_{ij}(f_n)$		Cross-spectral phase between gauges i and j at frequency f_n

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Charles E. Long

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U.S. Army Engineer Waterways Experiment Station
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13. ABSTRACT (Maximum 200 words)

This report indexes characteristic parameters of and describes a means of access to 2,320 wind wave frequency-direction spectra observed at the Texaco Oil Company Harvest Platform during calendar year 1994. Located at about the 200-m depth contour approximately 20 km west of Point Conception, California, the platform supports a spatial array of six pressure gauges, data from which are processed with an iterative maximum likelihood directional estimator. Nine parameters are defined, listed, and graphed in time series form: characteristic wave height, peak frequency, peak direction, four circular moments (mean direction, width, skewness, and kurtosis), and two parameters (directional spread and asymmetry) derived from quartile points of directional spectra. This report is the second in a series.

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